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THE UNITY OF NATURE

BY

THE DUKE OF ARGYLL

AUTHOR OF "THE REIGN OF LAW," ETC., ETC.

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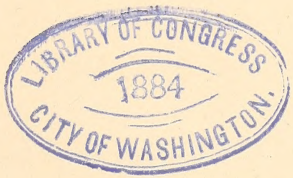

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PREFACE.

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AS explained in the Preface to the first Edition of the "Reign of Law," published in 1866, I had intended to follow the chapter on Law in Politics with a concluding chapter on Law in Christian Theology. It was natural to reserve for that chapter all direct reference to some of the most fundamental facts of Human Nature. Yet, without such reference, the Reign of Law, especially in the Realm of Mind, could not even be approached in some of its very highest and most important aspects. At that time, however, I shrank from entering upon questions so profound, of such critical import, and so inseparably connected with religious controversy.

Further reflection has convinced me that the great subject of Law in Christian Theology is not only incapable of being treated in a single chapter, but cannot even be entered upon at all without pre-

paratory investigations and preparatory arguments which it would take volumes to exhaust. What has to be done, in the first place, is to establish some method of inquiry, and to find some secure avenue of approach. Before dealing with any part of the Theology which is peculiarly Christian, we must trace the connection between the Reign of Law and the ideas which are alike fundamental to all Religions, and inseparable from the facts of Nature. It is to this preliminary work that the following chapters have been devoted. Modern Doubt has called in question not only the whole subject of inquiry, but the whole Faculties by which it can be pursued. Until these have been tested and examined by some standard which is elementary and acknowledged, we cannot even begin the work.

It has appeared to me that not a few of the problems which lie deepest in this inquiry, and which perplex us most, are soluble in the light of the Unity of Nature. Or if these problems are not entirely soluble in this light, at least they are broken up by it, and are reduced to fewer and simpler elements. The following chapters are an attempt to follow this conception along a few of the innumerable paths which it opens up, and which radiate from it through all the phenomena of the

Universe, as from an exhaustless centre of Energy and of Suggestion.

It is the great advantage of these paths that they are almost infinite in number and equally various in direction. To those who walk in them nothing can ever come amiss. Every subject of interest, every object of wonder, every thought of mystery, every obscure analogy, every strange intimation of likeness in the midst of difference—the whole external and the whole internal world—is the province and the property of him who seeks to see and to understand the Unity of Nature. It is a thought which may be pursued in every calling—in the busiest hours of an active life, and in the calmest moments of rest and of reflection. And if, in the wanderings of our own spirit, and in the sins and sorrows of Human Life, there are terrible facts which resist all classification and all analysis, it will be a good result of our endeavours to comprehend the Unity of Nature, should it lead us better to see, and more definitely to understand, those features in the character of Man which constitute The Great Exception.

I commend these chapters to the consideration of those who care for such inquiries. Like the earlier Work, of which this is a sequel, much of it has appeared separately in other forms. These portions have all been reconsidered, and to some extent

re-written ; whilst a new meaning has been given to the reasoning they contain by the place assigned to them in a connected Treatise. The chapters which were published last year as articles in the "Contemporary Review" called forth some criticisms from writers both in England and America from which I have derived advantage.

ARGYLL.

INVERARAY, *Dec.* 1883.

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THE

UNITY OF NATURE.

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CHAPTER I.

General Definitions and Illustrations of the Unity of Nature—what it is and what it is not.

THE System of Nature in which we live impresses itself on the mind as one System. It is under this impression that we speak of it as the Universe. It was under the same impression, but with a conception specially vivid of its order and its beauty, that the Greeks called it the Kosmos. By such words as these, we mean that Nature is one Whole—a Whole of which all the parts are inseparably united—joined together by the most curious and intimate relations, which it is the highest work of Observation to trace, and of Reason to understand.

I do not suppose that there is any need of proving this—of proving, I mean, that this is the general impression which Nature makes upon us. It may be well, however, to trace this impression to its

source—to see how far it is founded on definite facts, and how far it is strengthened by such new discoveries as science has lately added to the knowledge of Mankind.

One thing is certain: that whatever science may have done, or may be doing, to confirm Man's idea of the Unity of Nature, science, in the modern acceptation of the term, did not give rise to it. The idea had arisen long before science in this sense was born. That is to say, the idea existed before the acquisition of physical knowledge had been raised to the dignity of a pursuit, and before the methods and the results of that pursuit had been reduced to system. Theology, no doubt, had more to do with it. The idea of the Unity of Nature must be at least as old as the idea of one God: and even those who believe in the derivation of Man from the Savage and the Brute, cannot tell us how soon the Monotheistic doctrine arose. The Jewish literature and traditions, which are at least among the oldest in the world, exhibit this doctrine in the purest form, and represent it as the doctrine of primeval times. The earliest indications of religious thought among the Aryan races point in the same direction. The records of that mysterious civilisation which had been established on the Nile at a date long anterior to the Call of Abraham, are more and more clearly yielding results in harmony with the tradition of the Jews.

The Polytheism of Egypt is being traced and tracked through the many and the easy paths which lead to the fashioning of many Gods out of the attributes of One.*

Probably those who do not accept this conclusion as historically proved may hold rather that the idea of the Unity of Nature preceded the idea of the Unity of God, and that Monotheism is but the form in which that earlier idea became embodied. It matters not, so far as my present purpose is concerned, which of these two has been the real order of events. If the law prevailing in the infancy of our race has been at all like the law prevailing in the infancy of the individual, then Man's first Beliefs were derived from Authority, and not from either reasoning or observation. I do not myself believe that in the morning of the world Theism arose as the result of philosophical speculation, or as the result of Imagination personifying some abstract idea of the Unity of external Nature. But if this were possible, then it would follow that while a perception of the Unity of Nature must be at least as old as the idea of one Creator, it may be a good deal older. Whether the two ideas were ever actually separated in history, it is certain that they can be, and are separated at the present time. A sense and a perception of the Unity of Nature—strong, imaginative, and almost

* Renouf, "Hibbert Lectures," 1879, p. 89.

mystic in its character—is now prevalent among men over whom the idea of the personal agency of a living God has, to say the least, a much weaker hold.

What, then, is this Unity of Nature? Is it a fact or an imagination? Is it a reality or a dream? Is it a mere poetic fancy incapable of definition; or is it a conception firmly and legitimately founded on the phenomena of the world?

But there is another question which comes before these. What do we mean by unity? In what sense can we say that an infinite number and variety of things are nevertheless one? This is an important question, because it is very possible to look for the Unity of Nature in such a manner that, instead of extending our knowledge, or rendering it more clear and definite, we may rather narrow it, and render it more confused. It has been said that all knowledge consists in the perception of difference. This is not accurate: but it is true that the perception of difference is the necessary foundation of all knowledge. For if it be possible to give any short definition of that in which essentially all knowledge consists, perhaps the nearest approach to such a definition would be this: that knowledge is the perception of relations. To know a thing and to understand it, is to know it in its relation to other things. But the first step in this knowledge is to know it as distinguished from other things. The perception of

mere difference comes before the perception of all other and higher relations.

It is well, therefore, to remember that no increase of knowledge can be acquired by a wilful confounding or a careless forgetfulness of distinctions. We may choose to call two things one, because we choose to look at them in one aspect only, and to disregard them in other aspects quite as obvious, and perhaps much more important. And thus we may create a unity which is purely artificial, or which represents nothing but a comparatively insignificant incident in the System of Nature. For as things may be related to each other in an infinite variety of ways—in form, or in size, or in substance, or in position, or in modes of origin, or in laws of growth, or in work and function—so there are an infinite number and variety of aspects in which unity can be traced. And these aspects rise in an ascending series according to the completeness of our knowledge of things, and according to the development of those intellectual faculties by which alone the higher relations between them can be perceived. For the perception of every relation, even that of mere physical continuity, is purely the work of Mind, and this work can only be performed in proportion to the materials which are supplied, and to the power of interpretation which is enjoyed. It is very easy to rest satisfied with the perception of the commoner and more obvious relations

of things to each other, and even to be so engrossed with these as to be rendered altogether incapable of perceiving the finer and less palpable relations which constitute the higher aspects of the Unity of Nature. New relations, too, which are by no means obvious, but on the contrary can only be discovered by laborious analysis, may from the mere effect of novelty, engross attention far beyond their real importance. Nay, more—it may be said, with truth, that this is a danger which, for a time at least, increases with the progress of science, because it must obviously beset special subjects of inquiry and special methods of research. The division of labour necessarily becomes more and more minute with the complication of the work which is to be done, and branches out into a thousand channels of inquiry, each of which finds its natural termination in the ascertainment of some one special series of relations. The Chemist is engaged with the elementary combinations of matter, and finds a unity of composition among things which in all other aspects are totally diverse. The Anatomist is concerned with structure, and separates widely between things which may nevertheless be identical in chemical composition. The Physiologist is concerned with function; and, finding the same offices performed by a vast variety of structures, ranges them across all their differences under a single name. The Comparative Anatomist

is concerned with the relative place or position of the parts in Organic structures; and, although he finds the same part in different creatures performing widely different functions, he nevertheless pronounces them to be the same, and to be one in the homologies of an ideal archetype. But each of these inquirers may be satisfied with the particular unity which his own investigations lead him specially to observe, and may be blind altogether to the unity which is next above it.

Nor is it specialists alone who are in danger of forming narrow and inadequate conceptions of the Unity of Nature. Minds whose tendency it is to generalise are even more exposed to this danger than minds whose passion it is to investigate and arrange a particular class of facts. The work of generalisation is essentially a work of selection—the selection and separation of that which is essential from that which is comparatively unimportant, in the great connecting lines of Nature. If in this work the principle of selection be a wrong one—if it be founded on a narrow conception and a very partial understanding of the facts—if the great lines are not seen to be what they really are, and if little divergent lines are followed in their stead—then the most ambitious generalisations of science may be far more deceiving than the most despised of vulgar errors. For indeed these errors are sometimes errors only in their form, whilst in substance

they are often full of spirit and of truth. In them, not seldom, the popular eye has caught and reflected the masses of the forest, which the man of science has been prevented from seeing by the trees. And so it may well be that the sense of unity in Nature, which Man has had from very early times, reflected in such words as the "Universe," and in his belief in one God, is a higher and fuller perception of the truth than is commonly attained either by those who are engrossed in the laborious investigation of details, or by those who struggle to compress all the wealth of Nature within some abstract formula of the laboratory or of the workshop. This is one of the many cases in which the Intuitions of the Mind have preceded inquiry, and gone in advance of science, leaving nothing for systematic investigation to do, except to confirm, by formal proofs, that which has been already long felt and known.

I have already indicated the sense in which the Unity of Nature impresses itself on the Intelligence of Man. It is in that intricate dependence of all things upon each other which makes them appear to be parts of one System. And even where the connection falls short of dependence, or of any visible relation, the same impression of unity is conveyed in the prevalence of close and curious analogies which are not the less striking when the cause or the reason of them is unknown.

I propose in this chapter to specify some of

the signs of unity which the study of Nature has more definitely revealed, and consider how far they carry us.

There is one sign of unity, which, of itself, carries us very far indeed. It is the sign given to us in the ties by which this world of ours is bound to the other worlds around it. There is no room for fancy here. The truths which have been reached in this matter have been reached by walking in the paths of rigorous demonstration. This Earth is part of the vast Mechanism of the Heavens. The force, or forces, by which that mechanism is governed are forces which prevail not only in our own Solar System, but, as there is reason to believe, through all Space, and are determining, as astronomers tell us, the movement of our Sun, with all its Planets, round some distant centre, of which we know neither the nature nor the place. Moreover, these same forces are equally prevailing on the surface of this Earth itself. The whole of its physical phenomena are subject to the conditions which they impose.

If there were no other indications of unity than this, it would be almost enough. For the unity which is implied in the Mechanism of the Heavens is indeed a unity which is all-embracing and complete. The structure of our own Bodies, with all that depends upon it, is a structure governed by, and therefore adapted to, the same force of gravita-

tion which has determined the form and the movements of myriads of worlds. Every part of the human Organism is fitted to conditions which would all be destroyed in a moment if the forces of gravitation were to change or fail. It is, indeed, evident that a force such as this must govern the whole order of things in which it exists at all. Every other force must work, or be worked, in subordination to it.

Nor is gravitation the only agency which brings home to us the unity of the conditions which prevail among the worlds. There is another: Light—that sweet and heavenly messenger which comes to us from the depths of Space, telling us all we know of other worlds, and giving us all that we enjoy of life and beauty on our own. And there is one condition of unity revealed by Light which is not revealed by gravitation. For, in respect to gravitation, although we have an idea of the *measure*, we have no idea of the *method*, of its operation. We know with precision the numerical rules which it obeys, but we know nothing whatever of the way in which its work is done. But in respect to Light we have an idea not only of the measure, but of the mode of its operation. In one sense, of course, Light is a mere sensation in ourselves. But when we speak of it as an external thing, we speak of the cause of that sensation. In this sense, Light

is a wave, or an undulatory vibration, and such vibrations can only be propagated in a medium which, however thin, must be material. That this substance is at all like the chemical substance that we call "ether," is of course a metaphor. It is a good metaphor only in so far as the vapour of ether represents to us a form of Matter which is very thin, invisible, and impalpable. But although the application of this word to the medium in which Light is propagated is a metaphor, it is wholly erroneous to say, as is often said, that the existence of the medium is an hypothesis. The existence of some medium is as certain as any other fact in physics. A vibration, or an undulation, has no meaning except that of a movement in the particles of a material substance. Those who have disputed or doubted the use of the word "ether" as involving an hypothesis have been obliged to admit of a material medium in some form or other. Light, therefore, reveals to us the fact that we are united with the most distant worlds, and with all intervening space, by some ethereal atmosphere, which embraces and holds them all.

Moreover, the enormous velocity with which the vibrations of this atmosphere are propagated proves that it is a substance of the closest continuity, and of the highest tension. The tremors which are imparted to it by luminous bodies rush from particle to particle at the rate of 186,000 miles

in a second of time; and thus, although it is impalpable, invisible, and imponderable, we know that it is a medium infinitely more compact than the most solid substances which can be felt and weighed. It is very difficult to conceive this, because the waves or tremors which constitute Light are not recognisable by any sense but one; and the impressions of that sense give us no direct information on the nature of the medium by which those impressions are produced. We cannot see the luminiferous medium except when it is in motion; and not even then, unless that motion be in a certain direction towards ourselves. When this medium is at rest we are in utter darkness, and so are we also when its movements are rushing past us, but do not directly impinge upon us. The luminiferous medium is, therefore, in itself, invisible; and its nature can only be arrived at by pure reasoning—reasoning, of course, founded on observation, but observation of rare phenomena, or of phenomena which can only be seen under those conditions which Man has invented for analysing the operations of his own most glorious Sense. And never, perhaps, has Man's inventive genius been more signally displayed than in the long series of investigations which first led up to the conception, and have now furnished the proof, that Light is nothing but the undulatory movement of a substantial medium.

It is very difficult to express in language the ideas upon the nature of that medium which have been built up from the facts of its behaviour. It is difficult to do so, because all the words by which we express the properties of Matter refer to its more obvious phenomena—that is to say, to the direct impressions which Matter makes upon the senses. And so, when we have to deal with forms of Matter which do not make any impressions of the same kind—forms of Matter which can neither be seen, nor felt, nor handled, which have neither weight, nor taste, nor smell, nor aspect—we can only describe them by the help of analogies as near as we can find. But as regards the qualities of the medium which causes the sensation of Light, the nearest analogies are remote, and what is worse, they compel us to associate ideas which elsewhere are so dissevered as to appear almost exclusive of each other. It is now more than three quarters of a century since Dr. Thomas Young astonished and amused the scientific world by declaring of the luminiferous medium that he "was disposed to believe that it pervades the substance of all material bodies with little or no resistance as freely as the air moves through a grove of trees."* This suggests the idea of an element of extreme tenuity. And yet that

* Works of Dr. Young, vol. i. p. 188. Bakerian Lecture, Nov. 24, 1803.

element cannot be said to be thin in which a wave is transmitted with the enormous velocity of Light. On the contrary, its molecules must be in closest contact with each other when a tremor is carried by them through a thickness of 186,000 miles in a single second. Accordingly, Sir J. Herschel has declared that the luminiferous ether must be conceived of not as an air, nor as a fluid, but rather as a solid—"in this sense at least, that its particles cannot be supposed as capable of interchanging places, or of bodily transfer to any measurable distance from their own special and assigned localities in the universe."* Well may Sir J. Herschel add that "this will go far to realize (in however unexpected a form) the ancient idea of a crystalline orb." And thus the wonderful result of all investigation is that this Earth is in actual rigid contact with the most distant worlds in space—in rigid contact, that is to say, through a medium which touches and envelopes all, and which is incessantly communicating from one world to another the minutest vibrations it receives.

The laws, therefore, and the constitution of Light, even more than the law of gravitation, carry up to the highest degree of certainty our conception of the Universe as one;—one, that is to say, in virtue of the closest mechanical connection, and of the prevalence of one universal medium.

* "Familiar Lectures on Scientific Subjects," p. 285.

Moreover, it is now known that this medium is the vehicle not only of Light, but also of Radiant Heat, whilst it has likewise a special power of setting up, or of setting free, the mysterious action of Chemical Affinity. The beautiful experiments have become familiar by which these three kinds of energy can be separated from each other in the solar spectrum, and each of them can be made to exhibit its peculiar effects. With these again the forces of Galvanism and Electricity have some very intimate connection, which goes far to indicate like methods of operation in some prevailing element. Considering how all the forms of Matter, both in the Organic and in the Inorganic worlds, depend on one or other, or on all of these—considering how Life itself depends upon them, and how it flickers or expires according as they are present in due proportion—it is impossible not to feel that in this great group of powers, so closely bound up together, we are standing very close indeed to some pervading, if not universal, agency in the mechanism of Nature.

There are, however, a great many things in Nature to which we may stand very close indeed without being able to see them clearly, or to understand them at all. And this is the case with that great Pentarchy of Physical Forces which is constituted by Heat, Light, Magnetism, Electricity, and

Chemical Affinity. The relations between them are as intimate as they are obscure. But the nature of those relations, in so far as they are known, is pre-eminently suggestive of a unity which is founded on the co-ordination of agencies not in themselves identical, but, on the contrary, separated from each other by distinctions as profound as any which can prevail in physics. Writers and lecturers on Science are very apt to speak of these Forces as capable of being "transmuted" or "converted" into each other. But this is a loose and inaccurate representation of the facts. Carbon can be converted or transmuted into a diamond under certain conditions by a process which, so far as we know, adds nothing to it, and takes nothing from it. Under both aspects it is the same substance with no element subtracted, and no new element introduced. It has simply had its structure altered by a rearrangement of its particles. But no such identity can be asserted of the five great Physical Forces of which we are speaking now. It is true, indeed, that each of them seems sometimes to pass into the other, but only as one thing may be said to pass into another when that other is produced by its antecedent. Mechanical motion in the form of a blow struck against living flesh will inflict upon that flesh a wound. But it would hardly be correct to say that the motion of the blow is transmuted into extrava-

sated blood. In like manner when a skilful Savage twirls one dry stick upon another in a particular manner, he produces by the motion fire. But it would be an erroneous description of the fact to say that the muscular strength of the Savage is transmuted into flame.

Yet this, or something like this, is the nature of the sequence between the Physical Forces which is commonly described as transmutation. In all these cases there are incidents necessary to the effect which are due to other elements than are to be found in the apparently producing cause. There is this peculiarity, however, in the connection between the Physical Forces—that they may all interchangeably be either the cause or the consequence of each other. Mechanical Motion is the most common antecedent of them all. It will give rise to Light and Heat, whilst Heat and Light will both give rise to mechanical Motion. In like manner Heat and Light will give rise to Electricity, whilst, conversely, Electricity will give rise to Heat and Light. Again, Electricity will give rise to Magnetism, and Magnetism, when accompanied—but only when accompanied—by mechanical movement, will generate powerful currents of Electricity. These currents, again, are so closely connected with Chemical Force that they are the most powerful of all agents in setting that Force free to exert its selective energy. So

intimate is this connection that Electricity has been described as Chemical Force in motion—passing from one point of action to another through a chain of intervening substances. And yet the identification of Voltaic Electricity with Chemical Force eludes us again when it is considered that in itself it has no chemical effect (so far as is known) on the matter through which it passes by conduction. The wires which complete the circuit in a Voltaic battery suffer no decomposition or chemical change, although such a change is the origin of the current at one end, and is again the result of it at the other end. Chemical action will not arise except under special conditions. But when these conditions are present it will produce all the "correlated" forces, Heat, Light, Magnetism, and Electricity, whilst, conversely, all these forces either produce or stimulate or intensify Chemical Action.

This great cycle of Forces, therefore, constitutes, as it were, an endless chain, every link of which is in one sense separate from, and in another sense is united to, the rest. Each, regarded by itself, is distinguished by important differences from the others. The mechanical motion of a cannon-ball is a very different thing from the molecular vibration which it produces when that motion is stopped by a resisting body. Magnetism is very different from Electricity, inasmuch as in itself Magnetism is

statical, whereas Electricity is active. Magnetism, too, differs from other forms of Force in the great distinguishing feature of polarity,—so that every body which is magnetic is the seat of a dual force acting in opposite directions with equal energy. Moreover, this duality of direction in the action of Magnetic Force is inherent in every particle of the body, so that the minutest fragment of it manifests the same oppositeness as the whole mass. Chemical Affinity is the most mysterious of all the Physical Forces,—that of which it is most difficult to form any clear conception. But one characteristic of this Force is that it depends on difference or heterogeneousness in the composition of the matter which it affects. What the ultimate connection really is which exists between Forces in other respects so separate or distinct, is as yet one of the mysteries of science. Suspicion, if it be nothing more—that kind of surmise which in physical investigations has so often preceded discovery—points to that mysterious medium which from its most obvious function has been called the luminiferous ether. If movements in that medium constitute all that we know of one or two of the correlated Forces, it seems more than probable that it is at least an essential element in them all.

This close connection of so many various phenomena with different kinds of movement in a single medium is by far the most striking and instructive

speculation of modern science. It supplies to some extent a solid physical basis, and one veritable cause for part, at least, of the general impression of unity which the aspects of Nature leave upon the mind. For all work done by the same implement generally carries the mark of that implement, as it were of a tool, upon it. Things made of the same material, whatever they may be, are sure to be like in those characteristics which result from identical or from similar properties and modes of action. And so far, therefore, it is easy to understand the constant and close analogies which prevail in that vast circle of phenomena which are connected with Heat, Light, Electricity, Magnetism, and Chemical Affinity.

But although the employment of one and the same agency in the production of a variety of effects is, no doubt, one cause of the visible unity which prevails in Nature, it is not the only cause. The same close analogies exist where no such identity of agency can be traced. Thus the mode in which the atmosphere carries Sound is closely analogous to the mode in which the luminiferous medium carries Light. But this medium and the atmosphere are two very different agents, and the similarity of the laws which the undulations of both obey is due to some other and some more general cause of unity than identity of material. This more general cause

is to be found, no doubt, in one common law which determines the forms of motion in all Matter, and especially in highly elastic media.

But, indeed, the mere physical or mechanical unity which consists in the action of one great vehicle of power, even if this were more universally prevalent than it is known to be, is but the lowest step in the long ascent which carries us up to a unity of a more perfect kind. The means by which some one single implement can be made to work a thousand different effects, not only without interference, and without confusion, but with such relations between it and other agents as to lead to complete harmonies of result, are means which point to some unity behind and above the implement itself—that is to say, they point to some unity in the method of its handling, in the management of the impulses which, receiving, it conveys, and in the arrangement of the materials on which it operates.

No illustration can be given of this higher kind of unity which is half so striking as the illustration which is afforded by the astonishing facts now familiar as to the composition of Solar Light. When we consider that every colour in the Spectrum represents the motion of a separate wave or ripple, and that in addition to the visible series there are other series, one at each end of the luminous rays, which are non-luminous, and therefore invisible—all of

which consist of waves equally distinct; when we consider farther that all these are carried simultaneously with the same speed across millions of miles; that they are separable, and yet are never separated; that they move accurately together, without jostling or confusion, in perfect combination, yet so that each shall be capable of producing its own separate effect—it altogether transcends our faculties of imagination to conceive how movements of such infinite complication can be united in one such perfect order.

And be it observed that the difficulty of conceiving this is not diminished, but increased, by the fact that these movements are propagated in a single medium; because it is most difficult to conceive how the particles of the medium can be so arranged as to be capable of conveying so many different kinds of motion with equal velocities and at the same instant of time. It is clear that the unity of effect which is achieved out of this immense variety of movements is a unity which lies altogether behind the mere unity of material, and is traceable to some one order of arrangement under which the original impulses are conveyed. We know that in respect to the waves of Sound, the production of perfect harmonies among them can only be attained by a skilful adjustment of the instruments, whose vibrations are the cause and the measure of the aerial waves which, in their

combination, constitute perfect music. And so, in like manner, we may be sure that the harmonies of the Spectrum, effected as they are amongst an infinite number and variety of motions very easily capable of separation and disturbance, must be the result of some close adjustment between the constituent element of the conveying medium and the constituent elements of the luminous bodies whose complex, but joint, vibrations constitute that embodied Harmony which we know as Light. Moreover, as this adjustment must be close and intimate between the properties of the ether and the nature of the radiating bodies whose vibrations it repeats, so also must the same adjustment be equally close between these vibrations and the properties of Matter—both the living and the not-living—on which they exert such a powerful influence. And when we consider the number and the nature of the things which this adjustment must include—how it embraces the whole Organic and the whole Inorganic world, and every combination of the two—we can, perhaps, form some idea of what a bond and bridge it is between the most stupendous phenomena of the Heavens and the minutest phenomena of Earth. For this adjustment must be perfect between these several things—first, the flaming elements in the Sun which communicate the different vibrations in definite proportion; next, the constitution of the medium, which is capable

of conveying them without division, confusion, or obstruction; next, the constitution of our own atmosphere, so that neither shall it distort, nor confuse, nor quench the waves; and lastly, the constitution of those forms of Matter upon Earth which respond, each after its own laws, to the stimulus it is so made as to receive from the heating, lighting, and chemical undulations.

In contemplating this vast System of Adjustment, it is important to analyse and define, so far as we can, the impression of unity which it makes upon us; because the real scope and source of this impression may very easily be mistaken. It has been already pointed out that we can only see likeness by first seeing difference, and that the full perception of that in which things are unlike is essential to an accurate appreciation of that in which they are the same. The classifying instinct must be strong in the human mind, from the delight it finds in reducing diverse things to some one common definition. And this instinct is founded on the power of setting differences aside, and of fixing our attention on some selected conditions of resemblance. But we must remember that it depends on our width and depth of vision whether the unities which we thus select in Nature are the smallest and the most incidental, or whether they are the largest and the most significant. And, indeed, for some temporary purposes—as, for

example, to make clear to our minds the exact nature of the facts which science may have ascertained—it may be necessary to classify together as coming under one and the same category, things as different from each other as light from darkness. Nor is this any extreme or imaginary case. It is a case actually exemplified in a lecture by Professor Tyndall, which is entitled "The Identity of Light and Heat." Yet those who have attended the expositions of that eminent physical philosopher must be familiar with the beautiful experiments which show how distinct in another aspect are Light and Heat; how easily and how perfectly they can be separated from each other; how certain substances obstruct the one and let through the other; and how the fiercest heat can be raging in the profoundest darkness. Nevertheless, there is more than one mental aspect,—there is more than one method of conception,—in terms of which these two separable powers can be brought under one description. Light and Heat, however different in their effects—however distinct and separable from each other—can both be regarded as "Forms of Motion" among the particles of Matter. Moreover, it can be shown that both are conveyed or caused by waves, or undulatory vibrations in one and the same ethereal medium. And the same definition applies to the most active

chemical rays, which again are separable and distinct from the rays both of Light and Heat.

But although this definition may be correct as far as it goes, it is a definition nevertheless which slurs over and keeps out of sight distinctions of a fundamental character. In the first place, it takes no notice of the absolute distinction between Light or Heat considered as sensations of our Organism or as states of consciousness, and Light or Heat considered as the external agencies which produce these sensations in us. Sir W. Grove has expressed a doubt whether it is legitimate to apply the word "Light" at all to any rays which do not excite the sense of vision. This, however, is not the distinction to which I now refer as confounded when Light is identified with Heat. The confusion to which Sir W. Grove objects between visible and invisible rays is a confusion of language only. He puts that confusion clearly when he says, "Invisible light is darkness, and if it exist then is darkness light."* If it be an ascertained fact, or if it be the only view consistent with our present knowledge, that the ethereal pulsations which do, and those which do not, excite in us the sense of vision, are pulsations exactly of the same kind and in exactly the same medium, and that they differ in nothing but in periods of time or length of wave, so

* "Correlation and Continuity of the Physical Forces," p. 30, ed. 1874.

that our seeing of them or our not seeing of them depends on nothing but the focussing, as it were, of our eyes, then the inclusion of them under the same word Light involves no confusion of thought. We should confound no distinction of importance, for example, by applying the same name to grains of sand which are large enough to be visible, and to those which are so minute as to be wholly invisible even to the microscope. And if a distinction of this nature—a mere distinction of size, or of velocity, or of form of motion, were the only distinction between Light and Heat—it might be legitimate to consider them as identical, and to call them by the same name. But the truth is that there are distinctions between them of quite another kind. Light, in the abstract conception of it, consists in undulatory vibrations in the pure ether, and in these alone. They may or may not be visible—that is to say, they may or may not be within the range of our Organs of vision, just as a sound may or may not be too faint and low, or too fine and high, to be audible to our ears. But the word "Heat" carries quite a different meaning, and the conception it conveys could not be covered under the same definition as that which covers Light. Heat is inseparably associated in our minds with, and does essentially consist in, certain motions, not of pure ether, but of the molecules of solid or ponderable matter. These motions in solid or ponder-

able matter are not in any sense identical with the undulatory motions of pure ether which constitute Light. Consequently, when physicists find themselves under the necessity of defining more closely what they mean by the identity of Heat and Light, they are obliged to separate between two different kinds of Heat—that is to say, between two wholly different things, both covered under the common name of Heat—one of which is really identical in kind with Light, and the other of which is not. "Radiant" Heat is the kind, and the only kind of Heat, which comes under the common definition. "Radiant" Heat consists in the undulatory vibrations of pure ether which are set up or caused by those other vibrations in solid substances or ponderable matter, which are Heat more properly so called. Hot bodies communicate to the surrounding ethereal medium vibrations of the same kind with Light, some of these being, and others not being, luminous to our eyes. Thus we see that the unity or close relationship which exists between Heat and Light is not a unity of sameness or identity, but a unity which depends upon and consists in correspondences between things in themselves different. It has been suggested * that the facts of Nature would be much more clearly represented in language if the old word "Caloric"

* By Sir W. Thomson. Professor Balfour Stewart calls it "absorbed heat"—"to distinguish it from radiant heat, which is a very different thing" ("Conservation of Energy," p. 80).

were revived, in order to distinguish one of the two very different things which are now confounded under the common term "Heat"—that is to say, Heat considered as molecular vibration in solid or ponderable matter, and Heat considered as the undulatory vibrations of pure ether which constitute the "Heat" called "radiant." Adopting this suggestion, the relation between Light and Heat, as these relations are now known to science, may be thrown into the following propositions, which are framed for the purpose of exhibiting distinctions not commonly kept in view:

I. Certain undulatory vibrations in pure ether alone are Light, either (1) visible, or (2) invisible.

II. These undulatory vibrations in pure ether alone are not Caloric.

III. No motions of any kind in pure ether alone are Caloric.

IV. Caloric consists in certain vibratory motions in the molecules of ponderable matter or substances grosser than the ether, and these motions are not undulatory.

V. The motions in ponderable matter which constitute Caloric set up or propagate in pure ether the undulatory vibrations which constitute Light.

VI. Conversely, the undulatory vibrations in pure ether which constitute Light set up or pro-

pagate in grosser matter the motions which are Caloric.

VII. But the motions in pure ether which are Light cannot set up or propagate in all ponderable matter equally the motions which are Caloric. Transparent substances allow the ethereal undulations to pass through them with very little Caloric motion being set up thereby; and if there were any substance perfectly transparent, no Caloric motion would be produced at all.

VIII. Caloric motions in ponderable matter can be and are set up or propagated by other agencies than the undulations of ether, as by friction, percussion, &c.

IX. Caloric, therefore, differs from Light in being (1) motion in a different medium or in a different kind of matter; (2) in being a different kind of motion; (3) in being producible without, so far as known, the agency of Light at all. I say "so far as known," because as the luminiferous ether is ubiquitous, or as, at least, its absence cannot anywhere be assumed, it is possible that in the calorific effects of percussion, friction, &c., undulations of the ether may be always an essential condition of the production of Caloric.

It follows from these propositions that there are essential distinctions between Light and Heat, and

that the effect of luminiferous undulations or "Radiant" Heat in producing Caloric in ponderable matter depends entirely upon, and varies greatly in accordance with, the constitution or structure of the substances through which it passes, or upon which it plays.

The same fundamental distinction applies to those ethereal undulations which produce the effects called Chemical. No such effects can be produced upon substances except according to their special structure and properties. Their effect, for example, upon living matter is absolutely different from the effect they produce upon matter which does not possess Vitality. The forces which give rise to Chemical Affinity are wholly unknown. And so are those which give rise to the peculiar phenomena of living matter. The rays which are called Chemical may have no other part in the result than that of setting free the molecules to be acted upon by the distinct and separate forces which are the real sources of Chemical Affinity.

What, then, have we gained when we have grouped together, under one common definition, such a variety of movements and such a variety of corresponding effects? This is not the kind of unity which we see and feel in the vast system of adjustments between the Sun, the medium conveying its vibrations and the effect of these on all the phenomena of Earth.

The kind of unity which is impressed upon us is neither that of a mere unity of material nor of identity in the forms of motion. On the contrary, this kind of unity among things so diverse in all other aspects is a bare intellectual apprehension, only reached as the result of difficult research, and standing in no natural connection with our ordinary apprehension of physical truth. For our conception of the Energies with which we have to deal in Nature must be moulded on our knowledge of what they do, far more than on any abstract definition of what they are; or rather, perhaps, it would be more correct to say that our conception of what things are can only be complete in proportion as we take into our view the effects which they produce upon other things around them, and especially upon ourselves, through the Organs by which we are in contact with the external world. If in these effects any two agencies are not the same—if they are not even alike—if, perhaps, they are the very antithesis of each other—then the classification which identifies them, however correct it may be, as far as it goes, must omit some characteristics which are much more essential than those which it includes. The most hideous discords which can assail the ear, and the divinest strains of the most heavenly music, can be regarded as identical in being both a series of sonorous waves. But the thought, the preparation, the concerted design—in short, the unity of Mind and of Sentiment, on which

the production of musical harmony depends, and which it again conveys with matchless power of expression to other minds—all this higher unity is concealed and lost if we do not rise above the mere mechanical definition under which discords and harmonies can nevertheless be in this way correctly classed together.

And yet so pleased are we with discoveries of this kind, which reduce, under a common method of conception, things which we have been accustomed to regard as widely different, that we are apt to be filled with conceit about such definitions, as if we had reached in them some great ultimate truth on the nature of things, and as if the old aspects in which we have been accustomed to regard them were by comparison almost deceptive; whereas, in reality, the higher truth may well have been that which we have always known, and the lower truth that which we have recently discovered. The knowledge that Light and Heat are separable, that they do not always accompany each other, is a truer and juster conception of the relation in which they stand to us, and to all that we see around us, than the knowledge that they are both the same in respect of their being both "modes of motion." To know the work which a machine does is a fuller and higher knowledge than to know the nature of the materials of which its parts are composed, or even to perceive and

follow the kind of movement by which its effects are produced. And if there be two machines which, in respect to structure and movement and material, are the same, or closely similar, but which, nevertheless, produce totally different kinds of work, we may be sure that this difference is the most real and the most important truth respecting them. The new aspects in which we see their likeness are less full and less adequate than the old familiar aspects in which we regard them as dissimilar.

But the Mind is apt to be enamoured of a new conception of this kind, and to mistake its place and its relative importance in the sphere of knowledge. It is in this way, and in this way only, that we can account for the tendency among some scientific men to exaggerate beyond all bounds the significance of the abstract and artificial definitions which they reach by neglecting differences of work, of function, and of result, and by fixing their attention mainly on some newly discovered likeness in respect to form, or motion, or chemical composition. It is thus that because a particular substance called "Protoplasm" is found to be present in all living Organisms, an endeavour follows to get rid of Life as a separate conception, and to reduce it to the physical property of this material. The fallacy involved in this endeavour needs no other exposure than the fact that, as the appearance

and the composition of this material is the same whether it be dead or living, the Protoplasm of which such transcendental properties are affirmed has always to be described as "living" Protoplasm. But no light can be thrown upon the facts by telling us that Life is a property of that which lives. The expression for this substance which has been invented by Professor Huxley is a better one—the "Physical Basis of Life." It is better because it does not suggest the idea that Life is a mere physical property of the substance. But it is, after all, a metaphor which does not give an adequate idea of the conceptions suggested by the facts. The word "basis" has a distinct reference to a mechanical support, or to the principal substance in a chemical combination. But at the best there is only a distant and metaphorical analogy between these conceptions and the conceptions which are suggested by the connection between Protoplasm and Life. We cannot suppose Life to be a substance supported by another. Neither can we suppose it to be like a chemical element in combination with another. It seems rather like a Force of Energy which first works up the inorganic materials into the form of Protoplasm, and then continues to exert itself through that combination when achieved.

We call this kind of energy by a special name, Life, for the best of all reasons, that it has special effects

different from all others. It often happens that the philosophy expressed in some common form of speech is deep and true, whilst the objections which are made to it in the name of science are shallow and fallacious. This is the case with all those familiar phrases and expressions which imply that Life and its phenomena are so distinguishable from other things that they must be spoken of by themselves. The objection made by a well-known writer,* that we might as well speak of "a watch force" as of a "vital force," is an objection which has no validity, and is chargeable with the great vice of confounding one of the clearest distinctions which exist in Nature. The rule which should govern language is very plain. Every phenomenon or group of phenomena which is clearly separate from all others, should have a name as separate and distinctive as itself. The absurdity of speaking of a "watch force" lies in this—that the force by which a watch goes is not separable from the force by which many other mechanical movements are effected. It is a force which is otherwise well known, and can be fully expressed in other and more definite terms. That force is simply the elasticity of a coiled spring. But the phenomena of Life are not due to any force which can be fully and definitely expressed in other terms. It is not purely chemical, nor

* Mr. G. H. Lewes.

purely mechanical, nor purely electrical, nor reducible to any other more simple and elementary conception. The popular use, therefore, which keeps up separate words and phrases by which to describe and designate the distinctive phenomena of Life, is a use which is correct and thoroughly expressive of the truth. There is nothing more common and nothing more fallacious in philosophy than the endeavour, by mere tricks of language, to suppress and keep out of sight the distinctions which Nature proclaims with a loud voice.

It is thus, also, that because certain creatures which, when adult, are widely separate in the scale of Being, may be traced back to some embryonic stage, in which they are undistinguishable, it has become fashionable to sink the vast differences which must lie behind this uniformity of aspect and of material composition under some vague form of words in which the mind makes, as it were, a covenant with itself not to think of such differences as are latent and invisible, however important we know them to be by the differences of result to which they lead. Thus it is common now to speak of things widely separated in rank and function as being "the same," only "differentiated," or "variously conditioned." In these, and in all similar cases, the differences which are unseen, or which, if seen, are set aside, are often of in-

finitely greater importance than the similarities which are selected as the characteristics chiefly worthy of regard. If, for example, in the albumen of an egg there be no discernible differences either of structure or of chemical composition, but if, nevertheless, by the mere application of a little heat, part of it is "differentiated" into blood, another part of it into flesh, another part of it into bones, another part of it into feathers, and the whole into one perfect Organic Structure, it is clear that any purely chemical definition of this albumen, or any purely mechanical definition of it, would not merely fail of being complete, but would absolutely pass by and pass over the one essential characteristic of Vitality which makes it what it is, and determines what it is to be in the System of Nature.

Let us always remember that the more perfect may be the apparent identity between two things which afterwards become widely different, the greater must be the power and value of those invisible distinctions—of those unseen factors—which determine the subsequent divergence. These distinctions are invisible, not merely because our methods of analysis are too coarse to detect them, but because apparently they are of a nature which no physical dissection and no chemical analysis could possibly reveal. Some scientific men are fond of

speaking and thinking of these invisible factors as distinctions due to differences in "molecular arrangement," as if the more secret agencies of Nature gave us the idea of depending on nothing else than mechanical arrangement—on differences in the shape or in the position of the molecules of Matter. But this is by no means true. No doubt there are such differences—as far beyond the reach of the microscope as the differences which the microscope does reveal are beyond the reach of our unaided vision. But we know enough of the different agencies which must lie hid in things apparently the same, to be sure that the divergences of work which these agencies produce do not depend upon or consist in mere differences of mechanical arrangement. We know enough of those agencies to be sure that they are agencies which do, indeed, determine both arrangement and composition, but do not themselves consist in either.

This is the conclusion to which we are brought by facts which are well known. There are some simple structures in Nature which can be seen in the process of construction. There are conditions of matter in which its particles can be seen rushing under the impulse of invisible forces to take their appointed place in the Form which to them is a Law. Such are the facts visible in the processes of Crystallisation. In them we can see the particles of matter passing from one

"molecular condition" to another; and it is impossible that this passage can be ascribed either to the old arrangement which is broken up, or to the new arrangement which is substituted in its stead. Both structures have been built up out of elementary materials by some constructive agency which is the master and not the servant—the cause and not the consequence of the movements which are effected, and of the arrangement which is their result. And if this be true of crystalline forms in the mineral kingdom, much more is it true of Organic forms in the animal kingdom. Crystals are, as it were, the beginnings of Nature's architecture, her lowest and simplest forms of building. But the most complex crystalline forms which exist—and many of them are singularly complex and beautiful—are simplicity itself compared with the very lowest Organism which is endowed with Life. In the wonderful processes by which bone is formed, the foundations or the moulds of the structure are first laid down in cartilage or gristle. This is a compound substance purely Organic, whereas bone is a substance in which the mineral element Calcium or lime is imported into the structure for the purpose of giving it solidity. The movements and changes under which this importation of what may be called comparatively foreign material is effected, have been watched and described. They are changes and movements in the cartilage,—that is to say, in the

form and arrangement of the mould, which are suggestive of almost conscious anticipation. The mould can be seen in the process of being moulded. "The cells of the cartilage, with their cell-spaces, become larger—flatten out—and usually show a tendency to arrange themselves in parallel rows; between which, if the change has already been in progress for some time, the lines of calcification may be seen advancing." *

This is only one example out of thousands in which similar processes have been observed. In all living Organisms, therefore, still more than in the formation of Crystals, the work of "differentiation"—that is to say, the work of forming out of one material different structures for the discharge of different functions—is the work of agencies which are invisible and unknown; and it is in these agencies, not in the molecular arrangements which they cause, that the essential character and individuality of every Organism consists. Accordingly, in the development of seeds and of eggs, which are the germs of plants and animals respectively, the particles of matter can be traced moving, in obedience to forces which are unseen, from "molecular conditions" which appear to be those of almost complete homogeneity to other molecular conditions which are

* "On the Ossification of the Terminal Phalanges of the Digits," by F. A. Dixey, B.A., Oxon. Proceed. Ro. Soc., Vol. XXXI., No. 207.

of inconceivable complexity. In that mystery of all mysteries, of which Biologists talk so glibly, the living "nucleated Cell," the great work of Creation may be seen in actual operation, not caused by "molecular condition," but determining it, and, from elements which to all our senses, and to all our means of investigation, appear absolutely the same, building up the molecules of Protoplasm, now into a seaweed, now into a cedar of Lebanon, now into an insect, now into a fish, now into a reptile, now into a bird, now into a Man. And in proportion as the molecules of matter do not even seem to be the masters but the servants here, so do the forces which dispose of them stand out separate and supreme. In every germ this development can only be "after its kind." The molecules must obey; but no mere wayward or capricious order can be given to them. The formative energies seem to be as much under command as the materials upon which they work. For, invisible, intangible, and imponderable as these forces are—unknown and even inconceivable as they must be in their ultimate nature—enough can be traced of their working to assure us that they are all closely related to each other, and belong to a System which is one. Out of the chemical elements of Nature, in numerous but definite combinations, it is the special function of Vegetable Life to lay the

foundations of Organic Mechanism ; whilst it is the special function of Animal Life to take in the materials thus supplied, and to build them up into the highest and most complicated structures. This involves a vast cycle of operations, as to the unity of which we cannot be mistaken—for it is a cycle of operations obviously depending on adjustments among all the forces both of solar and terrestrial physics—and every part of this vast series of adjustments must be in continuous and unbroken correlation with the rest.

Thus every step in the progress of science which tends to reduce all Organisms to one and the same set of elementary substances, or to one and the same initial structure, only adds to the certainty with which we conclude that it is upon something else than composition, and upon something else than structure, that those vast differences ultimately depend which separate so widely between living things in rank, in function, and in power. And although we cannot tell what that something is—although science does not as yet even tend to explain what the directive agencies are or how they work—one thing, at least, is plain: that if a very few elementary substances can enter into an untold variety of combinations, and by virtue of this variety can be made to play a vast variety of parts, this result can only be attained by a system

of mutual adjustments as immense as the variety it produces, as minute as the differences on which it depends, and as centralised in direction as the order and harmony of its results. And so we come to understand that the unity which we see in Nature is that kind of unity which the Mind recognises as the result of operations similar to its own,—not a unity which consists in mere sameness of material, or in mere identity of composition, or in mere uniformity of structure, but a unity which consists in the subordination of all these to similar aims and to similar principles of action—that is to say, in like methods of yoking a few elementary forces to the discharge of special functions, and to the production, by adjustment, of one harmonious Whole.

And of this Unity, we who see it, and think of it, and speak of it—we are part. In Body and in Mind we belong to it, and are included in it. It is more easy to admit this as a general proposition than really to see it as a truth and to accept all the consequences it involves. The habitual attitude of our thoughts is certainly not in accordance with it. We look on "Nature" as something outside of us—something on which we can look down, or to which we can look up, according to our mood; but in any case, something in which we are exceptions, and which we can and ought to regard from an external

point of view. It may be well, therefore, to consider a little more carefully "Man's place in Nature"—his share and position in that unity which he sees and feels around him.

CHAPTER II.

Man's Place in the Unity of Nature.

MAN is included in the Unity of Nature, in the first place, as regards the composition of his Body. Out of the ordinary elements of the material world is that Body made, and into those elements it is resolved again. With all its beauties of form and of expression, with all its marvels of structure and of function, there is nothing whatever in it except some few of the elementary substances which are common in the atmosphere and the soil. The three commonest gases, oxygen, hydrogen, and nitrogen, with carbon and with sulphur, are the foundation stones. In slightly different proportions, these elements constitute the primordial combination of matter which is the abode of Life. In the finished structure there appear, besides, lime, potash, and a little iron, sodium, and phosphorus. These are the constituents of the human Body—of these in different combinations—and, so far as we know, of

nothing else. The same general composition, with here and there an ingredient less or more, prevails throughout the whole animal and vegetable world, and its elements are the commonest in the Inorganic Kingdom also.

This may seem a rude, and it is certainly a rudimentary view of the relation which prevails between ourselves and the world around us. And yet it is the foundation, or at least one of the foundations, on which all other relations depend. It is because of the composition of our Body, that the animals and plants around us are capable of ministering to our support—that the common air is to us the very breath of life, and that herbs and minerals in abundance have either poisoning properties or healing virtue. For both of these effects are alike the evidence of some relation to the Organism they affect ; and both are in different degrees so prevalent and pervading, that of very few things indeed can it be said that they are wholly inert upon us. Yet there is no substance of the thousands which in one manner or another affect the Body, which does not so affect it by virtue of some relation which it bears to the elements of which that Body is composed, or to the combinations into which those elements have been cast.

And here we ascend one step higher among the facts which include Man within the Unity of Nature.

For he is united with the world in which he moves, not only by the elements of which his Body is composed, but also by the methods in which those elements are combined—the forces by which they are held together, and the principles of construction according to which they are built up into separate Organs for the discharge of separate functions. Science has cast no light on the ultimate nature of Life. But whatever it be, it has evidently fundamental elements which are the same throughout the whole circle of the Organic world; the same in their relations to the Inorganic; the same in the powers by which are carried on the great functions of nutrition, of growth, of respiration, and reproduction. There are, indeed, infinitely varied modifications in the mechanism of the same Organs to accommodate them to innumerably different modes by which different animals obtain their food, their oxygen, and their means of movement. Yet so evident is the unity which prevails throughout, that Physiologists are compelled to recognise the fundamental facts of Organic Life as "the same, from the lowest animal inhabiting a stagnant pool up to the glorious mechanism of the human form." *

This language is not the expression of mere poetic fancy, nor is it founded on dim and vague

* On the Nervous System, by Alex. Shaw. Appendix to Sir Charles Bell's "Anatomy of Expression."

analogies. It is founded on the most definite facts which can be ascertained of the ultimate phenomena of Organic Life, and it expresses the clearest conceptions that can be formed of its essential properties. The creature which naturalists call the Amœba, one of the lowest in the animal series, consists of nothing but an apparently simple and formless jelly. But simple and formless as it appears to be, this jelly exhibits all the wonder and mystery of that power which we know as Life. It is in virtue of that power that the dead or inorganic elements of which it is composed are held together in a special and delicate combination, which no other power can preserve in union, and which begins to dissolve the moment that power departs. And as in virtue of this power the constituent elements are held in a peculiar relation to each other, so in virtue of the same power does the combination possess peculiar relations with external things. It has the faculty of appropriating foreign substances into its own, making them subservient to the renewal of its own material, to the maintenance of its own energy, and to the preservation of its own separate individuality. It has the faculty, moreover, of giving off parts of itself, endowed with the same properties, to lead a separate existence. This same substance, which when analysed has always the same chemical composition, and when

alive has always the same fundamental properties, is at the root of every Organism, whether animal or vegetable. Out of its material all visible structure is built up, and the power which holds its elements together is the same power which performs the further work of moulding them into tissues—first forming them and then feeding them, and then keeping them in life. This is as true of the highest Organism of Man as it is of the lowest, in which visible structure begins to be. The phenomena of disease have convinced Physiologists that all the tissues of the body are freely penetrated by the protoplasmic corpuscles of the blood, and that the primordial properties displayed in the substance of an Amœba, which has no distinguishable parts and no separate organs, afford the only key to the fundamental properties of every animal body. One eminent observer assigns so high a place to this protoplasmic matter as the primary physical agent in the building of the House of Life, and in its renovation and repair, that he considers all its other materials, and all its completed structures, as comparatively "dead."

But the unity of Man's body with the rest of Nature lies deeper still than this. The same elements and the same primary compounds are but the foundations from which the higher unities arise. These higher unities appear to depend

upon and to be explained by this—that there are certain things which must be done for the support of Animal Life, and these things are fundamentally the same from the lowest to the highest creatures. It is for the doing of these things that "Organs" are required, and it is in response to this requirement that they are provided. Food—that is to say, foreign material—must be taken in, and it must be assimilated. The circulating fluids of the body must have vessels in which to circulate, and through the walls of these they must be allowed to absorb oxygen; and when this cannot be done more simply, a special apparatus must be provided for the separation of this essential element of life from the air or from the water. Sensation must be localised and adapted to the perception of movements in surrounding media. The tremors of the atmosphere and of the luminiferous medium must first be caught upon responsive—that is to say, upon adapted—surfaces, and then they must be translated into the language of Sensation—that is to say, into sight and hearing. The heat evolved in the chemical processes of digestion and of oxygenation of the blood must be made convertible into other forms of motion. The forces thus concentrated must be stored, rendered accessible to the Will, and distributed to members which are at its command. These and many other uniform

necessities of the animal frame constitute a unity of function in Organs of the widest dissimilarity of form, so that however different they may be in shape, or in structure, or in position, they are all obviously reducible to one common interpretation. They do the same things—they serve the same purposes—they secure the same ends—or, to use the language of physiology, they discharge the same functions in the animal economy.

But more than this: even the differences of form steadily diminish as we ascend in the scale of Being. Not only are the same functions discharged, but they are discharged by Organs of the same general shape, formed on one pattern and occupying an identical position in one plan of structure. It is on this fact that the science of Comparative Anatomy is founded, and the well-established doctrine of "homologies." The homology of two Organs in two separate animals is nothing but the unity of place which they occupy in a structure which is recognised as one and the same in a vast variety of creatures—a structure which is one in its general conception, and one in the relative arrangement of its parts. In this clear and very definite sense, the body of Man, as a whole, is one in structure with the bodies of all vertebrate animals; and as we rise from the lowest of these to him who is the highest, we see that same structure elaborated into closer

and closer likeness, until every part corresponds—bone to bone, tissue to tissue, organ to organ.

It is round this fact that so many disputants are now fighting. But all the controversy arises not as to the existence of the fact, but as to its physical cause. The fact is beyond question. In a former work * I have dwelt at some length on the bearing of this fact on our conceptions of "Creation by Law," and on the various theories which assume that such close relationship in Organic Structure can be due to no other cause than blood relationship through ordinary generation. At present I am only concerned with the fact of unity, whatever may be the physical cause from which that unity has arisen. The significance of it, as establishing Man's place in the Unity of Nature, is altogether independent of any conclusion which may be reached as to those processes of creation by which his body has been fashioned on a plan which is common to him and to so many animals beneath him. Whether Man has been separately created out of the inorganic elements of which his body is composed, or whether it was born of matter previously organised in lower forms, this community of structure must equally indicate a corresponding community of relations with external things, and some antecedent necessity deeply seated in the very nature of

* "The Reign of Law."

those things, why his bodily frame should be like to theirs.

And, indeed, when we consider the matter, it is sufficiently apparent that the relationship of Man's body to the bodies of the lower animals is only a subordinate part and consequence of that higher and more general relationship which prevails between all living things and those elementary Forces of Nature which play in them, and around them, and upon them. If we could only know what that relationship is in its real nature and in its full extent, we should know one of the most inscrutable of all secrets. For that secret is no other than the ultimate nature of Life. The great object is to keep the little knowledge of it which we possess safe from the confusing effect of deceptive definitions. The real unities of Nature will never be reached by confounding her distinctions. For certain purposes it may be a legitimate attempt to reduce the definition of Life to its lowest terms—that is to say, it may be legitimate to fix our attention exclusively on those characteristics which are common to Life in its lowest and in its highest forms, and to set aside all other characteristics in which they differ. It may be useful sometimes to look at Life under the terms of such a definition, in order, for example, the better to conceive some of its relations with other things. But in doing so we must take care not to drop out of the terms

so defining Life anything really essential to the very idea of it. Artificial definitions of this kind are dangerous experiments in philosophy. It is very easy by mere artifices of language to obliterate the most absolute distinctions which exist in Nature. Between the living and the non-living there is a great gulf fixed, and the indissoluble connection which somehow, nevertheless, we know to exist between them, is a connection which does not fill up that gulf, but is kept up by some bridge being, as it were, artificially built across it. This unity, like the other unities of Nature, is not a unity consisting of mere continuity of substance. It is not founded upon sameness, but, on the contrary, rather upon difference, and even upon antagonisms. Only, the forces which are thus different and opposed are subordinate to a system of adaptation and adjustment.

Nor must we fail to notice the kind of unity which is implied in the very words "adaptation" and "adjustment"—and, above all others, in the special adjustments connected with Organic Life. There are many unions which do not involve the idea of adjustment, or which involve it only in the most rudimentary form. The mere chemical union, for example, of two or more elements—unless under special conditions—is not properly an adjustment. We should not naturally call the formation of rust an adjustment between the oxygen of the atmo-

sphere and metallic iron. When the combinations effected by the play of chemical affinities are brought about by the selection of elements so placed within reach of each other's reactions as to result in a given product, then that product would be accurately described as the result of co-ordination and adjustment. But the kind of co-ordination and adjustment which appear in the facts of Life is of a still higher and more complicated kind than this. Whatever the relationship may be between living Organisms and the elements, or elementary forces of external Nature, it certainly is not the relationship of mere chemical affinities. On the contrary, the unions which these affinities by themselves produce can only be reached through the dissolution and destruction of living bodies. The subjugation of chemical forces under some higher form of energy, which works them for the continued maintenance of a separate individuality—this is of the very essence of Life. The destruction of that separateness or individuality is of the very essence of Death. It is not Life, but the cessation of Life, which, in this sense and after this manner, effects a chemical union of the elements of the body with the same and with other elements around it. There is indeed an adjustment—a close and intricate adjustment—between the chemical affinities of these elements as they are combined in the living body; but it is an

adjustment of them under the controlling energy of a power which cannot be identified with any other, and which always presents phenomena peculiar to itself. Under that power we see that the laws and forces of Chemical Affinity, as exhibited apart from Life, are held, as it were, to service—compelled, indeed, to minister, but not allowed to rule. Through an infinite variety of Organisms, this mysterious subordination is maintained, ministering through an ascending series to higher and higher grades of sensation, perception, consciousness, and thought.

And here we come in sight of the highest adjustment of all. Sensation, perception, consciousness, and thought,—these, if they be not the very essence of Life, are at least—in their order—its highest accompaniments and result. They are the ultimate facts, they are the final realities, to which all lesser adjustments are themselves adjusted. For, as the elementary substances and the elementary Forces of Nature which are used in the building of the body are there held by the energies of Life under a special and peculiar relation to those same elements and to those same forces outside the body, so also are they held in peculiar relations to those characteristic powers in which we are compelled to recognise the rudimentary faculties of Mind. Sensation is the first of these,

and if it be the lowest, it is at least the indispensable basis of all the rest. As such, it cannot be studied too attentively in the first stages of its appearance, if we desire to understand the unity of which it is the index and result. We have seen that the mechanism of living bodies is one throughout the whole range of Animal Life —one in its general plan, and one even in the arrangement of many of its details. We have seen, too, that this unity rests upon that other—in virtue of which all Organisms depend for the maintenance of their life, upon adjustments to certain physical laws which are held, as it were, in vassalage, and compelled to service; doing in that service what they never do alone, and not doing in that service what they always do when freed from it.

And now we have to ask what that service is? We can only say that it is the service of Life in all its manifestations, from those which we see in the lowest creatures up to the highest of which, in addition, we are conscious in ourselves. I say "in addition"—because this is the fundamental lesson of Physiology and of Comparative Anatomy —that the principle and the mechanism of sensation are the same in all creatures, at least in all which have the rudiments of a nervous system. This identity of principle and of structure in the machinery of Sensation, taken together with the

identity of the outward manifestations which accompany and indicate its presence in animals, makes it certain that in itself it is everywhere the same. This does not mean, of course—very far from it—that the range of pleasure or of pain consequent on sensation — still less the range of intelligent perception—is the same throughout the Animal Kingdom. The range of pleasure or of pain, and still more the range of intelligent perception, depends on the association of higher faculties with mere sensations, and upon other peculiarities or conditions of Organisation. We all know by our own experience, when comparing ourselves with ourselves in different states of health or of disease, and by observing the like facts in others, that the degree of pleasure or of suffering, of emotion or of intellectual activity, which is connected with sensation, may be almost infinitely various according to various conditions of the body. But this does not affect the general proposition that Sensation is in itself one thing throughout the Animal Kingdom. It cannot be defined in language, because all language is founded on it, assumes it to be known, and uses the metaphors it supplies for the expression of our highest intellectual conceptions. But though it cannot be defined, this at least we can say concerning it, that Sensation is the characteristic property of Animal Life; that it is an affection of the

"Anima," of that which distinguishes animate from inanimate things, and that as such it constitutes one of the most essential of the fundamental properties of Mind.

So true is this, that the very word "Idea," which has played a memorable part in the history of speculation, and which in common speech has now come to be generally associated with the highest intellectual abstractions, has had in modern philosophy no other definite meaning than the impressions or mental images received through the senses. This is the meaning attached to it (although, perhaps, no writer has ever adhered to it with perfect consistency) in the writings of Descartes, of Locke, and of Bishop Berkeley; and it is well worthy of remark that the most extreme doctrine of Idealism, which denies the reality of Matter, and, indeed, the reality of everything except Mind, is a doctrine which may be as logically founded upon sensation in a Zoophyte as upon sensation in a Man. The famous proposition of Bishop Berkeley, which he considers as almost self-evidently true, "that the various sensations, or ideas imprinted on the sense, cannot exist otherwise than in the Mind perceiving them," is a proposition clearly applicable to all forms of sensation whatever. For every sensation of an Organism is equally in the nature of an "Idea" in being an

affection of the living principle, which alone is susceptible of such affections; and it is plainly impossible to conceive any sense-impression whatever as existing outside a living and perceiving creature.

We are now, indeed, so accustomed to attach the word "Idea" to the highest exercises of Mind, and to confine the word "Mind" itself to some of its higher manifestations, that it may startle some men to be told that sensation is in itself a mental affection. We have, however, only to consider for a moment how inseparably connected sensation is with appetite and with perception, to be convinced that in the phenomena of sensation we have the first raw materials and the first small beginnings of Intelligence and of Will. It is this fundamental character of sensation which explains and justifies the assertion of philosophers—an assertion which at first sight appears to be a mere paradox—that the "Ideas" we receive through the senses have no "likeness" to the objects they represent. For that assertion, after all, means nothing more than this —that the impressions made by external things upon living Beings through the senses, are in themselves mental impressions, and as such cannot be conceived as like in their own nature to inanimate and external objects. It is the mental quality of all sensation, considered in itself, which

is really affirmed in this denial of likeness between the affections of sense and the things which produce those affections in us. It is one of the many forms in which we are compelled to recognise the inconceivableness of any sort of resemblance between Mind and Matter, between external things and our own perceptive powers.

And yet it is across this great gulf of difference—apparently so broad and so profound—that the highest Unity of Nature is nevertheless established. Matter built up and woven into "Organs" under the powers of Life is the strong foundation on which this unity is established. It is the unity which exists between the living Organism and the elements around it which renders that Organism the appropriate channel of mental communication with the external world, and a faithful interpreter of its signs. And this the Organism is—not only by virtue of its substance and composition, but also and especially by virtue of its adjusted structures. All the organs of sense discharge their functions in virtue of a purely mechanical adjustment between the structure of the Organ and the particular form of external force which it is intended to receive and to transmit. How fine those adjustments are can best be understood when we remember that the retina of the eye is a machine which measures and distinguishes

between vibrations which are now known to differ from each other by only a few millionths of an inch. Yet this amount of difference is recorded and made instantly appreciable in the sensations of colour by the adjusted mechanism of the eye. Another adjustment, precisely the same in principle, between the vibrations of Sound and the structure of the ear, enables those vibrations to be similarly distinguished in another special form of the manifold language of sensation. And so of all the other organs of sense —they all perform their work in virtue of that purely mechanical adjustment which places them in a given relation to certain selected manifestations of external force, and these they faithfully transmit, according to a code of signals, the nature of which is one of the primary mysteries of Life, but the truthfulness of which is at the same time one of the most certain of its facts.

For it is upon this truthfulness—that is to say, upon a close and efficient correspondence between the impressions of Sense and certain corresponding realities of external Nature—that the success of every Organism depends in the battle of life. And all Life involves a battle. It comes indeed to each animal without effort of its own, but it cannot be maintained without individual exertion. That exertion may be of the simplest kind, nothing more than the rhythmic action of a muscle contracting and expanding so as

to receive into a sac such substances as currents of water may bring along with them; or it may be the more complex action required to make or induce the very currents which are to bring the food; or it may be the much more complex exertions required in all active locomotion for the pursuit and capture of prey: all these forms of exertion exist, and are all required in endless variety in the animal world. And throughout the whole of this vast series the very life of every creature depends on the unity which exists between its sense-impressions and those realities of the external world which are specially related to them. There is therefore no conception of the Mind which rests on a broader basis of experience than that which affirms this unity—a unity which constitutes and guarantees the various senses with their corresponding appetites, each in its own sphere of adapted relations, to be exact and faithful interpreters of external truth.

A still more wonderful and striking proof is obtained of the Unity of Nature, and a still more instructive light is cast upon the depth of its source and character, when we observe how far-reaching these interpretations of sense are even in the very lowest creatures: how they are true not only in the immediate impressions they convey, but true also as the index of truths which lie behind and beyond —of truths, that is to say, which are not expressly

included—not directly represented—in either sensation or perception. This, indeed, is one main function and use, and one universal characteristic, of all sense-impressions, that over and above the pleasure they give to sentient creatures, they lead and guide to acts required by natural laws which are not themselves objects of sensation at all, and which therefore the creatures conforming to them cannot possibly either see or comprehend. It is thus that the appetite of hunger and the sense of taste, which in some form or other, however low, is perhaps the most universal sensation of animal Organisms, is true not only as a guide to the substances which do actually gratify the sense concerned, but true also in its unseen and unfelt relations with those demands or laws of force which render the assimilation of new material an indispensable necessity in the maintenance of Animal Life. Throughout the whole Kingdom of Nature this law prevails. Sense-perceptions are in all animals indissolubly united with instantaneous impulses to action. This action is always directed to external things. It finds in these things the satisfaction of whatever desire is immediately concerned, and beyond this it ministers to ends of which the animal knows nothing, but which are of the highest importance both in its own economy and in the general economy of Nature.

The wonderful instincts of the lower animals—the precision and perfection of their work—are a glorious example of this far-reaching adjustment between the perceptions of sense and the laws which prevail in the external world. Narrow as the sphere of those perceptions may be, yet within that sphere they are almost absolutely true. And although the sphere is indeed narrow as regards the very low and limited Intelligence with which it is associated in the animals themselves, it is a sphere which beyond the scope of their Intelligence can be seen to place them in unconscious relation with endless vistas of co-ordinated action. The sentient actions of the lower animals involve not merely the rudimentary power of perceiving the differences which distinguish things, but the much higher power of profiting by those relations between things which are the foundation of all voluntary agency, and which place in the possession of living creatures the power of attaining ends through the employment of appropriate means. The direct and intuitive perception of things which stand in the relation of means to ends, though it may be entirely dissociated from any conscious recognition of this relation in itself—that is to say, the direct and intuitive perception of the necessity of doing one thing in order to attain to another thing—is in itself one of the very highest among the pre-

adjusted harmonies of Nature. For it must be remembered that those relations between things which render them capable of being used as means to ends, are relations which never can be the direct objects of Sensation, and therefore the power of acting upon them is an intuition of something which is out of sight. It is a kind of dim seeing of that which is invisible. And even if it be separated entirely in the lower animals—as it almost certainly is—from anything comparable with our own prescient and reasoning powers, it does not the less involve in them a true and close relation between their instincts and the Order of Nature with its laws.

The spinning machinery which is provided in the body of a Spider is not more accurately adjusted to the viscid secretion which is provided for it, than the instinct of the Spider is adjusted both to the construction of its web and also to the selection of likely places for the capture of its prey. Those birds and insects whose young are hatched by the heat of fermentation have an intuitive impulse to select the proper materials, and to gather them for the purpose. All creatures, guided sometimes apparently by senses of which we know nothing, are under like impulses to provide effectually for the nourishing of their young. It is, moreover, most curious and instructive to

observe that the extent of prevision which is involved in this process, and in the securing of the result, seems very often to be greater as we descend in the scale of Nature, and in proportion as the parents are dissociated from the actual feeding or personal care of their young. The Mammalia have nothing to provide except food for themselves, and have at first, and for a long time, no duty to perform beyond the discharge of a purely physical function. Milk is secreted in them by a purely unconscious process, and the young need no instruction in the art of sucking. Birds have much more to do—in the building of nests, in the choice of sites for these, and after incubation, in the choice of food adapted to the period of growth. Insects, much lower in the scale of Organisation, have to provide very often for a much more distant future, and for various stages of development not only in their own young but in the *nidus* which surrounds them.

There is one group of insects, well known to every observer—the common Gall-flies—which have the power of calling on the vegetable world to do for them the work of nest-building; and in response to the means with which these insects are provided, the Oak, or the Willow, or the Rose, does actually lend its power of growth to provide a special *nidus* by which the plant protects the young

insect as carefully as it protects its own seed. I shall dwell on this example for a moment, because it is not easy to exhaust the wonders which are involved in this cycle of operations. For it is to be observed that they are not operations conducted according to the ordinary laws of Nature. It is indeed according to that ordinary course that vegetable Organisms should pour out their juices when they are wounded. It is an incident of their lower organisation, and lower rank in the scale of life, that they can bleed more copiously from such wounds without fatal injury than it would be possible for animals to bleed. But the flow of the juices under such circumstances is as it were a heedless flow—vacant of any purpose or intention—discharging no function in the vegetable economy or in the economy of external Nature. Least of all has it any regard to life other than its own. If any insect be involved in that flow, the consequences to it are instant death. Its legs and wings are clogged; its respiratory orifices are filled up, and every function of its body is stopped for ever. It is thus that some of the insects of a former age in the world's history have been preserved to us by the exudations of some unknown species of Pine, whose hardened gum is known to us as Amber. It is also according to the ordinary course of Nature that foreign substances introduced into the growing tissues of a

plant should be surrounded by those tissues and involved in them. But here also the involvement is purely mechanical, and the grip with which the intruding substance is seized and held, is a grip blind and ruthless. Bands of the strongest iron are often thus involved, and are burst asunder like green withes by the slow but tremendous energies of vegetable growth. The woody fibre too, which surrounds such substances, is very apt to be the hardest and toughest of all, and this is almost invariably the case with the growths which arise from injury or disease, with the wens and excrescences on the bark and stems of trees.

It is therefore in absolute difference and contradistinction from all these natural laws, that the Oak, for example, is made to provide out of its own substance a wonderful nest for the egg and larva of the Gall-fly. If we examine one form of these nests, for example, that of the Marble Gall (which is the nest of the species known to entomologists as the *Cynips Kolleri*), we shall find that there has been formed on the branch or twig of the Oak a globular body of the most curious and complex structure. Externally, it has a skin which imitates the natural bark. Internally, it consists of a pithy tissue which is wholly unlike any of the tissues produced by the Oak under its natural conditions. It is a radiating tissue, and yet it does not radiate from the point

which is its apparent point of growth or of attachment to the stalk. It radiates from its own centre, —or rather from a little cell or chamber which occupies that centre. This cell or chamber is internally quite smooth, has a thin wall of hardened material, and is of the exact size and capacity which will admit of the insect larva being coiled up comfortably within it, and of attaining there a certain definite degree of development or of growth. Outside the thin wall of this cell or chamber, and between it and the external bark, the whole sphere is filled with a substance which may be described as a granular pith which radiates in all directions from the cell to the circumference. If one of these Galls be cut or broken open in the autumn when it is becoming ripe, and if the cut be made so as to expose the whole in section, one of the most curious sights in Nature is exposed to view. The grub is seen folded in its pregnant rest. The mysterious changes which are going on in its body are indeed invisible. And so also are the equally mysterious processes by which that body came to be there at all, and to be provided with such a home. These processes are wholly different in kind from all others in Nature. Among birds, the embryo chick is hatched within a shell which has indeed a wonderful structure and many curious properties. But that shell is constructed in the ovary of the

mother-bird, and out of calcareous material which that mother has taken in as food. The Dormouse builds the nest in which itself hybernates. It is a wonderful structure, built from the inside outwards, suspended also by the inmate, before it closes the final aperture, upon the bough of some sheltered thicket, and so warmly spun that neither the rains nor cold of winter can pierce the texture and chill the sleeper. But in this case the animal has the mechanical weapons by which the material can be cut and can be woven. The Caterpillar also spins its own cocoon; but here also the spinning machinery is given to the creature, and the secretions of its own body are sufficient to provide the threads, which, when farther woven, are the richest and costliest of human garments. But there is no similar explanation of this strange abode of the larva of the Gall-fly. It has no means of making the nest in which it lies: the material does not come from its own body, nor from the bodies of its parents. Neither is that material even woven or built or fashioned by the one or by the other. Across a great gap and gulf in Nature—even that which separates a highly-organised plant from a highly-organised insect—this strange unity of co-operation has been effected. The Oak has yielded up its juices to protect a stranger: they overflow it without venturing to involve it,—circling round it and

bending over it,—as if in awe before a Life which is higher than their own. If it be true that Solomon in all his glory was not arrayed like a flower, it is equally true that neither Solomon when an infant, nor any child of Man, has ever been cradled as this insect is. All the richest products of Nature and of art are sometimes lavished on the little bed which is to hold a human infant. For these purposes, and for a thousand others like to these, Nature yields to Man her dead products, but she never yields her living powers. Yet for the nurture and protection of this poor maggot, the most secret of these powers are held to labour. The forces of vegetable growth work for it as they never work even for their own natural organs. They secrete for it a peculiar substance; they mould it into a peculiar form; they hang it out in the light and air as if it were their own fruit; they even exhaust themselves in its service, and their own flowers and leaves are often cankered in its support.

All this is an exception to ordinary laws: a break, as it might almost seem, in the Unity and in the Continuity of Nature. And so in a sense it is. It is no natural function of the Oak or of the Rose to produce these Galls. They are in one sense of the word unnatural, and in the truest sense of the word highly artificial. But this is the very character which reveals their place in the Unity of Nature by

revealing them in connection with a higher circle of laws than those in ordinary operation. Under these higher laws, the mere physical and vital forces are seen to be as clay in the hands of the Potter. Their subordination may be hidden sometimes, at least to our blind eyes, under the Uniformities of Nature: but it becomes, as it were, almost tangible and visible when these Uniformities are so strangely broken. And yet in what may be called this distortion of Vegetable vitality to purposes which are in a sense unnatural, there is no breach in the great mental law which demands the special adaptation of means to ends. This adaptation is revealed when we examine the structure of the mother Gall-fly. It then becomes at once apparent that the Gall is produced by the operation of an elaborate apparatus. This apparatus is so elaborate and so complicated that the most eminent Entomologists have been exercised upon its mechanism since the days of Reaumur, without being able fully to explain or understand it. The general principle, indeed, or idea of the apparatus appears to be ascertained. It is an apparatus for inserting the egg of the fly into vegetable tissue, with such effects upon that tissue, both by mechanical injury and by chemical poisoning, that the plant is stimulated and excited to abnormal action and to artificial growths. For this extraordinary purpose, and with this most mysterious

and complicated result, there is elaborated in the body of the fly implements for boring, for rasping, for brushing, for irritating by mechanical means the substance of the plant. The same implements are farther made to subserve the function of inserting the egg, and along with it of inserting also some acrid animal secretion which has a specific action on the secretions of the plant. This is the sum and substance of all that is known about it. It leaves the special mystery of the result wholly unexplained; because in no other case, and under no other guidance, can either mechanical injury or chemical poisoning produce in plants any morbid growth which is other than regardless of the interests and of the life of external Organisms. But although the method of operation is wholly inexplicable, and the general result remains as exceptional as before, yet the fact of it being done by an apparatus as special and exceptional as the result, is a fact which brings it at once within the Unity of Nature in the highest sense in which that Unity is intelligible to us. We can at least see that it is done by knowing how to do it. The great gap and gulf which lies in Organisation between the Plant and the Insect is spanned and arched across by knowledge of intimate relations between them which are unknown to us, and by command over resources which bring these relations into artificial co-operation.

And then when this recognition is arrived at, other recognitions follow, which bring into closer and closer correspondence the phenomena of our own Mind, and the peculiar series of phenomena which in the case of the Gall-flies are to be observed in Nature. For just as the human Mind, when a new idea has shone upon it, reflects that idea in a variety of forms, and finds new and ever newer applications for it, so it transpires that in like manner Nature, having as it were entered upon this very special line of contrivance for the development of insect life, pursues it through every form and variety of device. Not only are there a great variety of Galls produced by different species of fly upon different species of tree, but a great variety is produced upon the same tree by the different apparatus with which different flies are armed. The bark is attacked by one species, the leaves by another; the young shoots, the parts of fructification, and even the tendrils of the roots, have, each and all, some special form of Gall-fly to whom they are compelled to yield their various powers and functions. But in every case those functions are as it were perverted from the ordinary course of Nature, and develop products unlike to any which they develop when that ordinary course is not interfered with. The Galls which hang upon the Catkins are like a bunch of grapes. The root pro-

duces a large Gall, in which are chambers provided for a whole colony of grubs. Some Galls are prickly, some are branched, and some resemble little artichokes. Others are of the colour and consistency of waxy apples. One foreign species is invaluable in the manufacture of ink, because the united chemistry of the insect and the plant have there produced an acid which Nature does not elsewhere distil.*

Now, it is to be observed of all this wonderful combination and co-operation of agencies, animal and vegetable, that the blind appetite and instinct of the creature, which impels it to set this apparatus to work in the proper place, is an instinct in which the whole knowledge and foreknowledge of these operations is hidden and implied. The perceptions of taste, or of smell, or of whatever other sense they may have, and which we have not, which determine the choice of the fly and make it select the right portion of the plant for the work of depositing its egg, are perceptions which are true for a long way beyond the immediate operation which they at once stimulate and direct. They are perceptions which stand in unbroken—though they are unseen—relations with a whole world beyond that which the creature sees, and with a distant future.

* Westwood's Introduction to the Modern Classification of Insects, vol. II., the Cynipidæ, *passim*.

There is another example of the same wealth of meaning in animal instincts which in some points of view is even more remarkable. Bees, if we are to believe the evidence of observers, have an intuitive guidance in the selection of food, which has the power of producing organic changes in the bodies of the young, and by the administration of which, under what may be called artificial conditions, the sex of certain selected individuals can be determined, so that they may become the mothers and queens of future hives.

These are but a few examples of facts of which the whole animal world is full, presenting, as it does, one vast series of adjustments between bodily Organs and corresponding instincts. But this adjustment would be useless unless it were part of another adjustment between the instincts and perceptions of animals and those facts and forces of surrounding Nature which are related to them, and to the whole cycle of things of which they form a part. In those instinctive actions of the lower animals which involve the most distant and the most complicated anticipations, it is clear that the prevision which is involved is a prevision which is not in the animals themselves. They appear to be guided by some simple appetite, by an odour or a taste, and they have obviously no more consciousness of the ends to be subserved,

or of the mechanism by which they are secured, than the suckling has of the processes of nutrition. The path along which they walk is a path which they did not engineer. It is a path made for them, and they simply follow it. But the propensities and tastes and feelings which make them follow it, and the rightness of its direction towards the ends to be attained, do constitute a Unity of Adjustment which binds together the whole world of Life, and the whole inorganic world on which living things depend.

I have called this adjustment mechanical, and so, in the strictest sense, it is. We must take care, however, not to let our conceptions of the realities of Nature be rendered indistinct by those elements of metaphor which abound in language. These elements, indeed, when kept in their proper places, are not only the indispensable auxiliaries of thought, but they represent those perceptions of the mind which are the highest and the most absolutely true. They are the recognition—often the unconscious recognition—of the central Unities of Nature. Nevertheless, they are the prolific source of error when not closely watched. Because all the functions and phenomena of Life appear to be strictly connected with an Apparatus, and may therefore be regarded as brought about by adjustments which are mechanical, therefore it has been concluded that

those phenomena, even the most purely mental, are mechanical in the same sense in which the work is called mechanical which human machines perform. Are not all animals "Automata?" Are they not "mere machines?" This question has been revived from age to age since philosophy began, and has been discussed in our own time with all the aid which the most recent physiological experiment can afford. It is a question of extreme interest in its bearing on our present subject. The sense in which, and the degree to which, all mental phenomena are founded on, and are the result of mechanical adjustments, is a question of the highest interest and importance. The phenomena of Instinct, as exhibited in the lower animals, are undoubtedly the field of observation in which the solution of this question may best be found, and I cannot better explain the aspect in which it presents itself to me, than by discussing it in connection with certain exhibitions of Animal Instinct which I had occasion to observe during the spring and summer of 1874. They were not uncommon cases. On the contrary, they were of a kind of which the whole world is full. But not the less directly did they suggest all the problems under discussion, and not the less forcibly did they strike me with the admiration and the wonder which no familiarity can exhaust.

CHAPTER III.

Animal Instinct in its Relation to the Mind of Man.

THE Dipper or Water-ousel (*Cinclus aquaticus*) is well known to Ornithologists as one of the most curious and interesting of British birds. Its special habitat is clear mountain streams. These it never leaves except to visit the lakes into which or from which they flow. Without the assistance of webbed feet, it has extraordinary powers of swimming and of diving—moving about upon and under the surface with more than the ease and dexterity of a fish—hunting along the bottom as if it had no power to float—floating on the top as if it had no power to sink—now diving where the stream is smooth, now where it is quick and broken, and suddenly reappearing perched on the summit of some projecting point. Its plumage is in perfect harmony with its haunts—dark, with a pure white breast, which looks exactly like one of the flashes of light so numerous in rapid streams, or one of the

little balls of foam which loiter among the stones. Its very song is set to the music of rapid waters. By careful stepping along the top of a river-bank one can often get quite close to the Dipper when it is singing, and the harmony of its notes with the tinkling of the stream is really curious. It sings too when all other birds but the Robin are silent—in the depth of winter when the stones on which it sits are circled and rimed with ice. No bird, perhaps, is more specially adapted to a very special home and very peculiar habits of life. The same species, or other forms so closely similar as to seem mere varieties, are found in almost every country of the world where there are clear mountain streams. And yet it is a species having no very near affinity with any other bird, and it constitutes by itself a separate genus. It is therefore a species of great interest to the Naturalist, and raises some of the most perplexing questions connected with the "Origin of Species."

In 1874 a pair of these birds built their nest at Inveraray, in a hole in the wall of a small tunnel constructed to carry a rivulet under the walks of a pleasure ground. The season was one of great drought, and the rivulet, during the whole time of incubation and of the growth of the young in the nest, was nearly entirely dry. One of the nestlings, when almost fully fledged, was taken out by the hand

for examination, an operation which so alarmed the others that they darted out of the hole, and ran and fluttered down the tunnel towards its mouth. At that point a considerable pool of water had survived the drought, and lay in the paths of the fugitives. They did not at all appear to seek it; on the contrary, their flight seemed to be as aimless as that of any other fledgling would have been in the same predicament. But one of them stumbled into the pool. The effect was most curious. When the young bird touched the water, there was a moment of pause, as if the creature were surprised. Then instantly there seemed to wake within it the sense of its hereditary powers. Down it dived with all the facility of its parents, and the action of its wings under the water was a beautiful exhibition of the double adaptation to progression in two very different elements, which is peculiar to the wings of most of the diving birds. The young Dipper was immediately lost to sight among some weeds, and so long did it remain under water, that I feared it must be drowned. But in due time it reappeared all right, and being recaptured, was replaced in the nest.

Later in the season, on a secluded lake in one of the Hebrides, I observed a Dun-diver, or female of the Red-breasted Merganser (*Mergus Serrator*), with her brood of young ducklings. On giving

chase in the boat, we soon found that the young, although not above a fortnight old, had such extraordinary powers of swimming and diving, that it was almost impossible to capture them. The distance they went under water, and the unexpected places in which they emerged, baffled all our efforts for a considerable time. At last one of the brood made for the shore, with the object of hiding among the grass and heather which fringed the margin of the lake. We pursued it as closely as we could, but when the little bird gained the shore, our boat was still about twenty yards off. Long drought had left a broad margin of small flat stones and mud between the water and the usual bank. I saw the little bird run up about a couple of yards from the water, and then suddenly disappear. Knowing what was likely to be enacted, I kept my eye fixed on the spot; and when the boat was run upon the beach, I proceeded to find and pick up the chick. But on reaching the place of disappearance, no sign of the young Merganser was to be seen. The closest scrutiny, with the certain knowledge that it was there, failed to enable me to detect it. Proceeding cautiously forwards, I soon became convinced that I had already overshot the mark; and, on turning round, it was only to see the chick rise like an apparition from the stones, and dashing past the stranded boat, regain the lake,—

where, having now recovered its wind, it instantly dived and disappeared. The tactical skill of the whole of this manœuvre, and the success with which it was executed, were greeted with loud cheers from the whole party; and our admiration was not diminished when we remembered that some two weeks before that time the little performer had been coiled up inside the shell of an egg, and that about a month before it was apparently nothing but a mass of albumen and of fatty oils.

The third case of Animal Instinct which I shall here mention was of a different but of an equally common kind. In walking along the side of a river with overhanging banks, I came suddenly on a common Wild Duck (*Anas Boschus*), whose young were just out. Springing from under the bank, she fluttered out into the stream with loud cries and with all the struggles to escape of a helplessly wounded bird. To simulate the effects of suffering from disease, or from strong emotion, or from wounds upon the human frame, is a common necessity of the actor's art, and it is not often really well done. The tricks of the theatre are seldom natural, and it is not without reason that "theatrical" has become a proverbial expression for false and artificial representations of the realities of life. It was therefore with no small interest that on this, as on many other occasions, I watched the per-

fection of an art which Mrs. Siddons might have envied. The laboured and half-convulsive flapping of the wings, the wriggling of the body, the straining of the neck, and the whole expression of painful and abortive effort, were really admirable. When her struggles had carried her a considerable distance, and she saw that they produced no effect in tempting us to follow, she made resounding flaps upon the surface of the water, to secure that attention to herself which it was the great object of the manœuvre to attract. Then rising suddenly in the air, she made a great circle round us, and returning to the spot, renewed her endeavours as before. It was not, however, necessary; for the separate instinct of the young in successful hiding effectually baffled all my attempts to discover them.

I pass now from these exhibitions of Instinct in the class of birds to one which I observed in the class of insects during the recent winter, November 1882. It was in the beautiful Riviera, where insect life continues much more active at that season than it can be anywhere in the north of Europe. But even there, although Bees are busy during the greater part of winter, and some of our own Sylviadæ find an abundant living throughout the season, the Order of the Lepidoptera are generally dormant. I was surprised, therefore, late in the month of November, to see a large insect of this Order come from above the olive

trees overhead, with the wild, dashing flight of the larger Moths. Attracted apparently by a sheltered and sunny recess in which scarlet Geraniums and Bignonias were in full flower, the Moth darted downwards, and after a little hovering, settled suddenly on the bare ground underneath a Geranium plant. I then saw that it was a very handsome species, with an elaborate pattern of light and dark chocolate browns. But the margins of the upper or anterior wings, which were deeply waved in outline, had a lustrous yellow colour, like a brilliant gleam of light. In this position the Moth was a conspicuous object. After resting for a few seconds, apparently enjoying the Sun, it seemed to notice some movement which gave it alarm. It then turned slightly round, gave a violent jerk to its wings, and instantly became invisible. If it had subsided into a hole in the ground, it could not have more completely disappeared. As, however, my eyes were fixed upon the spot, I soon observed that all the interstices among the little clods around were full of withered and crumpled leaves of a deep blackish brown. I then further noticed that the spot where the Moth had sat was apparently occupied by one of these, and it then flashed upon me in a moment that I had before me one of the great wonders and mysteries of Nature. There are some forms of mimicry which are wholly independent of

any action on the part of the animals themselves, and this kind of mimicry is especially common in this class of insects. They are often made of the shape and of the colour which are most like those of the surrounding objects in their habitat. They have nothing to do except to sit still, or perhaps to crouch. But there are other forms of mimicry in which the completeness of the deception depends on some co-operation of the animal's own will. This was one of these. The splendid margins of the upper wings, with the peculiar shape and their shining colour, had to be concealed; and so, by an effort which evidently required the exertion of special muscles, these margins were somehow folded down—reverted—covered up, and thus hidden out of sight. The remainder of the wings, or the under surfaces which were now made uppermost, were so coloured and so crumpled up that they imitated exactly the dried and withered leaves around.

And now I tried an experiment to test another feature in the wonderful instincts which are involved in all these operations. That feature is the implicit confidence in its success which is innate in all creatures furnished with any apparatus of concealment. I advanced in the full sunlight close up to the Moth —so close that I could see the prominent "beaded eyes," with the watchful look—and the roughened outlines of the thorax, which served to complete the

illusion. So perfect was the deception, that I really could not feel absolutely confident that the black spot I was examining was what I believed it to be. Only one little circumstance reassured me. There was a small hole in the outer covering through which a mere point of the inner brilliant margin could be seen shining like a star. Certain now as to the identity of the Moth, I advanced still nearer, and finally I found that it was not till the point of a stick was used to touch and shake the earth on which it lay that the creature could believe that it was detected and in danger. Then in an instant, by movements so rapid as to escape the power of vision, the dried and crumpled leaf became a living Moth, with energies of flight defying all attempts at capture.

Let us now look at the questions which these several exhibitions of Animal Instinct cannot fail to suggest; and first let us take the case of the young Dipper. There was no possibility of imitation here. The rivulet beneath the nest, even if it had been visible to the nestlings, had been dry ever since they had been hatched. The river into which it ordinarily flowed was out of sight. The young Dippers never could have seen the parent birds either swimming or diving. This, therefore, is one of the thousand cases which have driven the "Experience" school of philosophy to take up new ground.

The young Dipper here cannot possibly have had any experience, either through the process of incipient effort, or through the process of sight and imitation. Nature is full of similar cases. In face of them it is now no longer denied that in all such cases "Innate Ideas" do exist, and that "Pre-established Harmonies" do prevail in Nature. These old doctrines, so long ridiculed and denied, have come to be admitted, and the new philosophy is satisfied with attempts to explain how these "Ideas" came to be innate, and how these Harmonies came to be pre-established. The explanation is, that though the efficiency of experience as the cause or source of Instinct must be given up as regards the individual, we may keep it as regards the race to which the individual belongs. The powers of swimming and diving, and the impulse to use them for their appropriate purpose, were indeed innate in the Dipper of 1874. But then they were not innate in its remote progenitors. They were acquired by those progenitors through gradual effort —the trying leading to success, and the success again leading to more trying—both together leading first to special faculty, then to confirmed habit, and then, by hereditary transmission, to instinct "organised in the race." Well, but even if this be true, was not the disposition of the progenitors to make the first efforts in the direction of swimming and

diving, and were not the Organs which enabled them to do so, as purely innate as the perfected instinct and the perfected Organs of the Dipper of to-day? Did there ever exist in any former period of the world what, so far as I know, does certainly not exist now—any animal with dispositions to enter on a new career, thought of and imagined for the first time by itself, unconnected with any Organs already fitted for and appropriate to the purpose? Even the highest acquirements of the Dog, under highly artificial conditions of existence, and under the guidance of persistent "interferences with Nature," are nothing but the special education of original instincts. In the almost human caution of the old and well-trained pointer when approaching game, we see simply a development of the habit of all predatory animals to pause when close upon an unseen prey—a pause requisite to verify the intimations of smell by the sense of sight, and also for preparing the final spring. It is true that Man "selects," but he can only select out of what is already there. The training and direction which he gives to the promptings of Instinct may properly be described as the result of experience in the animal under instruction: and it is undoubtedly true that, within certain limits (which, however, are after all very narrow), these results do tend to become hereditary. But there is nothing really analogous in Nature to the artificial

processes of training to which Man subjects the animals which are capable of domestication. Or if there be anything analogous—if animals by themselves can school themselves by gradual effort into the development of new powers—if the habits and powers which are now purely innate and instinctive were once less innate and more deliberate—then it will follow that the earlier faculties of animals have been the higher, and that the later faculties are the lower in the scale of Intelligence. This is hardly consistent with the accepted idea of Evolution,—which is founded on the conception of an unfolding or development from the lower to the higher, from the simple to the complex, from the Instinctive to the Rational. My own belief is, that whatever of truth there is in the doctrine of Evolution is to be found in this conception, which, so far as we can see, does seem to be embodied in the history of Organic Life. I can therefore see no light in this new explanation to account for the existence of instincts which are certainly antecedent to all individual experience—the explanation, namely, that they are due to the experience of progenitors "organised in the race." It involves assumptions contrary to the analogies of Nature, and at variance with the fundamental facts, which are the best, and indeed the only, basis of the theory of Evolution. There is no probability—there is hardly any plausi-

bility—in the supposition that experience has had, in past times, some connection with Instinct which it has ceased to have in the present day. The Uniformity of Nature has, indeed, often been asserted in a sense in which it is not true, and used in support of arguments which it will not sustain. All things have certainly not continued as they are since the Beginning. There was a time when Animal Life, and with it Animal Instincts, began to be. But we have no reason whatever to suppose that the nature of Instinct then or since has ever been different from its nature now. On the contrary, as we have in existing Nature examples of it in infinite variety, from the very lowest to the very highest forms of Organisation, and as the same phenomena are everywhere repeated, we have the best reason to conclude that, in the past, Animal Instinct has ever been what we now see it to be—congenital, innate, and wholly independent of experience.

And indeed, when we come to think about it, we shall find that the theory of Experience assumes the pre-existence of the very powers for which it professes to account. The very lowest of the faculties by which experience is acquired is the faculty of imitation. But the desire to imitate must be as instinctive as the Organs are hereditary by which imitation is effected. Then follow in their order all

the higher faculties by which the lessons of experience are put together—so that what has been in the past is made the basis of anticipation as to what will be in the future. This is the essential process by which experience is acquired, and every step in that process assumes the pre-existence of mental tendencies and of mental powers which are purely instinctive and innate. To account for Instinct by experience is nothing but an Irish bull. It denies the existence of things which are nevertheless assumed in the very terms of the denial: it elevates into a cause that which must in its nature be a consequence, and a consequence, too, of the very cause which is denied. Congenital instincts, and hereditary powers, and pre-established harmonies, are the origin of all experience, and without them no one step in experience could ever be gained. The questions raised when a young Dipper, which had never before even seen water, dives and swims with perfect ease, are questions which the theory of organised experience does not even tend to solve; on the contrary, it is a theory which leaves those questions precisely where they were, except in so far as it may tend to obscure them by obvious confusions of thought.

Passing now from explanations which explain nothing, is there any light in the theory that animals are "Automata?" Was the young Dipper

a diving machine? It seems to me that there is at least a glimmer shining through this idea—a glimmer as of a real light struggling through a thick fog. The fog arises out of the mists of language—the confounding and confusing of meanings literal with meanings metaphorical—the mistaking of partial for complete analogies. "Machine" is the word by which we designate those combinations of mechanical force which are contrived and put together by Man to do certain things. One essential characteristic of them is that they belong to the world of the not-living; they are destitute of that which we know as Life, and of all the attributes by which it is distinguished. Machines have no sensibility. When we say of anything that it has been done by a machine, we mean that it has been done by something which is not alive. In this literal signification it is therefore pure nonsense to say that anything living is a machine. It is simply a misapplication of language—to the extent of calling one thing by the name of another thing, and that other so different as to be its opposite or contradictory.

There can be no reasoning, no clearing up of truth, unless we keep definite words for definite ideas. Or if the idea to which a given word has been appropriated be a complex idea, and we desire to deal with one element only of the meaning, separated from the

rest, then, indeed, we may continue to use the word for this selected portion of its meaning, provided always that we bear in mind what it is that we are doing. This may be, and often is, a necessary operation, for language is not rich enough to furnish separate words for all the complex elements which enter into ideas apparently very simple; and so of this word, machine, there is an element in its meaning which is always very important, which in common language is often predominant, and which we may legitimately choose to make exclusive of every other. This essential element in our idea of a machine is that its powers, whatever they may be, are derived, and not original. There may be great knowledge in the work done by a machine, but the knowledge is not in it. There may be great skill, but the skill is not in it; great foresight, but the foresight is not in it; in short, great exhibition of all the powers of Mind, but the mind is not in the machine itself. Whatever it does, is done in virtue of its construction, which construction is due to a Mind which has designed it for the exhibition of certain powers and the performance of certain functions. These may be very simple, or they may be very complicated, but whether simple or complicated, the whole play of its operations is limited and measured by the intentions of its constructor. If that constructor be himself limited either in opportunity, or know-

ledge, or in power, there will be a corresponding limitation in the things which he invents and makes. Accordingly, in regard to Man, he cannot make a machine which has any of the gifts and the powers of Life. He can construct nothing which has sensibility or consciousness, or any other of even the lowest attributes of living creatures. And this absolute destitution of even apparent originality in a machine—this entire absence of any share of consciousness, or of sensibility, or of Will—is one part of our very conception of it. But that other part of our conception of a machine, which consists in its relation to a contriver and constructor, is equally essential, and may, if we choose, be separated from the rest, and may be taken as representative of the whole. If, then, there be any Agency in Nature, or outside of it, which can contrive and build up structures endowed with the gifts of Life, structures which shall not only digest, but which shall also feel and see, which shall be sensible of enjoyment from things conducive to their welfare, and of alarm on account of things which are dangerous to the same—then such structures have the same relation to that Agency which machines have to Man, and in this aspect it may be a legitimate figure of speech to call them living machines. What these machines do is different in kind from the things which human machines do ; but both are

alike in this—that whatever they do is done in virtue of their construction, and of the powers which have been given to them by the Mind which made them.

Applying now this idea of a machine to the phenomena exhibited by the young Dipper, its complete applicability cannot be denied. In the first place, the young Dipper had a physical structure adapted to diving. Its feathers were of a texture to throw off water, and the shower of pearly drops which ran off it, when it emerged from its first plunge, showed in a moment how different it was from other fledglings in its imperviousness to wet. Water appeared to be its "native element" precisely in the same sense in which it is said to be the native element of a ship which has been built high in air, and of the not very watery materials of wood and iron. Water which it had never seen before, seemed to be the native element of the little bird in this sense, that it was so constructed as to be and to feel at home in it at once. Its "lines" had been laid down for progression both in air and water. It was launched with a motive-power complete within itself, and with promptings sufficient for the driving of its own machinery. For the physical adaptation was obviously united with mental powers and qualities which partook of the same preadjusted

harmony. These were as congenital as the texture of its feathers or the structure of its wing. Its terror arose on seeing the proper objects of fear, although they had never been seen before, and no experience of injury had arisen. This terror prompted it to the proper methods of escape, and the knowledge how to use its faculties for this object was as intuitive as the apparatus for effecting it was hereditary. In this sense the Dipper was a living, breathing, seeing, fearing, and diving machine—ready made for all these purposes from the nest—as some other birds are even from their first exclusion from the egg.

The case of the young Merganser is still more curious and instructive with reference to the same questions. The young of all the *Anatidæ* are born, like the gallinaceous birds, not naked or blind, as most others are, but completely equipped with a feathery down, and able to swim or dive as soon as they see the light. Moreover, the young of the Merganser have the benefit of seeing from the first the parent bird performing these operations, so that imitation may have some part in developing the perfection with which they are executed by the young. But the particular manœuvre resorted to by the young bird which baffled our pursuit was a manœuvre in which it could have had no instruction from example—the manœuvre,

namely, which consists in hiding not under any cover but by remaining perfectly motionless on the ground. This is a method of escape which cannot be resorted to successfully except by birds whose colour is adapted to the purpose by a close assimilation with the colouring of surrounding objects. The old bird would not have been concealed on the same ground, and would never itself resort to the same method of escape. The young, therefore, cannot have been instructed in it by the method of example. But the small size of the chick, together with its obscure and curiously mottled colouring, are specially adapted to this mode of concealment. The young of all birds which breed upon the ground are provided with a garment in such perfect harmony with surrounding effects of light as to render this manœuvre easy. It depends, however, wholly for its success upon absolute stillness. The slightest motion at once attracts the eye of any enemy which is searching for the young. And this absolute stillness must be preserved amidst all the emotions of fear and terror which the close approach of the object of alarm must, and obviously does, inspire. Whence comes this splendid, even if it be unconscious faith in the sufficiency of a defence which it must require such nerve and strength of Will to practise? No movement, not even the slightest, though

the enemy should seem about to trample on it; such is the terrible requirement of Nature—and by the child of Nature implicitly obeyed! Here again, beyond all question, we have an instinct as much born with the creature as the harmonious tinting of its plumage—the external furnishing being inseparably united with the internal furnishing of Mind which enables the little creature in very truth to "walk by faith and not by sight." Is this automatonism? Is this machinery? Yes, undoubtedly in the sense explained before—that the instinct has been given to the bird in precisely the same sense in which its structure has been given to it—so that anterior to all experience, and without the aid of instruction or of example, it is inspired to act in this manner on the appropriate occasion arising.

Then, in the case of the Wild Duck, we rise to a yet higher form of Instinct, and to more complicated adaptations of congenital powers to the contingencies of the external world. It is not really conceivable that Wild Ducks have commonly many opportunities of studying each other's action when rendered helpless by wounds. Nor is it conceivable that such study can have been deliberately made even when opportunities do occur. When one out of a flock is wounded all the others make haste to escape, and it is certain that this trick of imitated helplessness is

practised by individual birds which can never have had any such opportunities at all. Moreover, there is one very remarkable circumstance connected with this instinct, which marks how much of knowledge and of reasoning is implicitly contained within it. As against Man the manœuvre is not only useless but it is injurious. When a man sees a bird resorting to this imitation, he may be deceived for a moment, as I have myself been; but his knowledge and experience and his reasoning faculty soon tell him from a combination of circumstances that it is merely the usual deception. To Man, therefore, it has the opposite effect of revealing the proximity of the young brood, which would not otherwise be known. I have repeatedly been led by it to the discovery of the chicks. Now, the most curious fact of all is that this distinction between Man and other predacious animals is recognised and reflected in the instinct of birds. The manœuvre of counterfeiting helplessness is very rarely resorted to except when a Dog is present.* Dogs are almost uniformly deceived by it. They never can resist the temptation presented by a bird which flutters apparently helpless just in front of their nose. It is, therefore, almost always successful in drawing them off, and

* I have since seen it resorted to by the American Merganser, on the Restigouche River, in Canada, when the object of alarm was a barge "poled" or "punted" down the stream. It evidently gave the impression of an enemy chasing the young on the water.

so rescuing the young from danger. But it is the sense of smell, not the sense of sight, which makes Dogs so specially dangerous. The instinct which has been given to birds seems to cover and include the knowledge that as the sense of smell does not exist to the like effect in Man, the mere concealment of the young from sight is ordinarily, as regards him, sufficient for their protection: and yet I have on one occasion seen the trick resorted to when Man only was the source of danger, and this by a species of bird which does not habitually practise it, and which can have had neither individual nor ancestral experience. This was the case of a Blackcap (*Sylvia Atricapilla*), which fell to the ground from a bush as if wounded, in order to distract attention from its nest.

If now we examine, in the light of our own Reason, all the elements of knowledge or of intellectual perception upon which the instinct of the Wild Duck is founded, and all of which, as existing somewhere, it undoubtedly reflects, we shall soon see how various and extensive these elements of knowledge are. First, there is the knowledge that the cause of the alarm is a carnivorous animal. On this fundamental point no creature is ever deceived. The youngest chick knows a Hawk, and the dreadful form fills it with instant terror. Next, there is the knowledge that Dogs and other carnivorous quadrupeds have

the sense of smell, as an additional element of danger to the creatures on which they prey. Next, there is the knowledge that the Dog, not being itself a flying animal, has sense enough not to attempt the pursuit of prey which can avail itself of this sure and easy method of escape. Next, there is the conclusion from all this knowledge, that if the Dog is to be induced to chase, it must be led to suppose that the power of flight has been somehow lost. And then there is the further conclusion, that this can only be done by such an accurate imitation of a disabled bird as shall deceive the enemy into a belief in the possibility of capture. And lastly, there are all the powers of memory and the qualities of imagination which enable good acting to be performed. All this reasoning and all this knowledge is certainly involved in the action of the bird-mother, just as certainly as reasoning and knowledge of a much profounder kind is involved in the structure or adjustment of the Organic machinery by which and through which the action is itself performed.

In the case of the Moth upon the Riviera, we have the same general principles involved and rendered in some respects more remarkable, in proportion to the much lower Intelligence which belongs to the Class of insects as compared with the Class of birds. But the law is the same in both cases—the law, namely, of a close and perfect correspondence

between the physical machinery for any given purpose, and the psychological endowments which enable that machinery to be properly applied. It surprised me to see this Moth lighting on the bare ground underneath the leaves and flowers which seemed to attract its attention. But if this choice and selection had not been made, and if it were not habitually made by this species of Moth, its apparatus of disguise would have been useless for the intended purpose. The Moth might, indeed, in any situation exert the muscles which reverted the wing, and which degraded the whole appearance of its body into the semblance of dead and rotten vegetation. But then, in every situation except that actually chosen, such an object would not have evaded notice, but on the contrary would have attracted it. And therefore it was that the Moth passed by all the beautiful leaves and flowers, and settled rather on a clod. But this "therefore," with all the train of reasoning which the choice involved, we cannot suppose to have existed consciously in the Moth. Yet that it existed somewhere is as certain as the existence of the Organic structure by which the disguise was rendered possible, or the existence of the Instinct in the creature, which is at once the index and the consummation of the whole arrangement.

There is unquestionably a sense, and a very important sense, in which all these wonderful opera-

tions of Instinct are "automatic." The intimate knowledge of physical and of physiological laws—the knowledge even of the mental qualities and dispositions of other animals—and the processes of reasoning by which advantage is taken of these,—this knowledge and this reasoning cannot, without manifest absurdity, be attributed to the birds themselves. This is admitted at least as regards the birds of the present day. But surely the absurdity is quite as great if this knowledge and reasoning, or any part of it, be attributed to birds of a former generation. In the past history of the species there may have been change—there may have been development. But there is not the smallest reason to believe that the progenitors of any bird or of any beast, however different in form, have ever founded on deliberate effort the instincts of their descendants. All the knowledge and all the resources of Mind which is involved in these instincts is a reflection of some Agency which is outside the creatures which exhibit them. In this respect it may be said with truth that they are machines. But then they are machines with this peculiarity, that they not only reflect, but also in various measures and degrees partake of the attributes of Mind. It is always by some one or other of these attributes that they are guided—by fear, or by desire, or by affection, or by mental impulses which go straight to the results of reason-

ing without its processes. That all these mental attributes are connected with a physical Organism which is constructed on mechanical principles, is not a matter of speculation. It is an obvious and acknowledged fact. The question is not whether, in this sense, animals are machines, but whether the work which has been assigned to them does or does not partake in various measures and degrees of the various qualities which we recognise in ourselves as the qualities of sensation, of consciousness, and of Will.

On this matter it seems clear to me that in some recent discussions the doctrine of Descartes has been seriously misconceived. It is true that a passage has been quoted * as representing the view of "orthodox Cartesians," in which it is asserted that animals "eat without pleasure and cry without pain," and that they "desire" nothing as well as "know" nothing. But this passage is quoted, not from Descartes, but from Malebranche. Malebranche was a great man; but on this subject he was the disciple and not the master; and it seems almost a law that no utterance of original genius can long escape the fate of being travestied and turned to nonsense by those who take it up at second hand. Descartes' letter to Moore of the 5th February 1649, proves conclusively that he fully recognised in the

* By Professor Huxley.

lower animals the existence of all the affections of Mind except "Thought" (*la Pensée*), or Reason properly so called. He ascribes to them the mental emotions of fear, of anger, and of desire, as well as all the sensations of pleasure and of pain. What he means by Thought is clearly indicated in the passage in which he points to Language as the peculiar product and the sole index of Thought—Language, of course, taken in its broadest sense, signifying any system of signs by which general or abstract ideas are expressed and communicated. This, as Descartes truly says, is never wanting even in the lowest of men, and is never present in the highest of the brutes. But he distinctly says that the lower animals, having the same Organs of sight, of hearing, of taste, &c., with ourselves, have also the same sensations, as well as the same affections of anger, of fear, and of desire—affections which, being mental, he ascribes to a lower kind or class of Soul, an "ame corporelle." Descartes, therefore, was not guilty of confounding the two elements of meaning which are involved in the word machine—that element which attaches to all machines made by Man as consisting of dead non-sentient matter—and that other element of meaning which may be legitimately attached to structures which have been made, not to simulate, but really to possess all the essential properties of Life. "Il faut pourtant re-

marquer," says Descartes, emphatically; "que je parle de la pensée, *non de la vie, ou de sentiment.*" *

The experiments quoted by Professor Huxley and by other Physiologists, on the phenomena of vivisection, and especially on what is called the "reflex action" of living nerve-tissues, cannot alter or modify the general conclusions which have long been reached on the unquestionable connection between all the functions of Life and the mechanism of the body. The question remains whether the ascertainment of this connection in its details can alter our conceptions of what Life and sensation are. No light is thrown on this question by cutting out from an Organism certain parts of the machinery which are known to be the seat of consciousness and of Will, and then finding that the animal is still capable of certain movements which are usually indicative of sensation and of purpose. Surely the reasoning is bad which argues that because a given movement goes on after the animal has been mutilated, this movement must therefore continue to possess all the same elements of character which accompanied it when the animal was complete. And not only is the reasoning bad, but as a matter of fact the conclusion has been proved to be erroneous. Farther investigations have shown that when the cerebral hemispheres have been removed, the "reflex action" in a frog's

* Œuvres de Descartes (Cousin), vol. x. p. 205 *et seq.*

leg acquires a new character. It becomes a mere result of Physical Causation, and is consequently as certain and inevitable as the action of a coiled spring. Accordingly it can be predicted and foreseen with certainty. In short, the mental element has been eliminated along with that part of the machinery which is the Organ of consciousness and Will. But when that part of the machinery remains untouched, then "reflex action" loses its character of necessity as the result of mere mechanical causation. It cannot be predicted with certainty, because although the "stimulus" may be the same, and the animal impulse may be the same, there is a controlling apparatus to which has been given the free and incalculable power of resisting both stimulus and impulse. Both parts of the apparatus are equally machinery. But the one has a mental function, and the other has a function purely physical.*

The character of purpose in one sense or another belongs to all Organic movements whatever—to those which are independent of conscious sensation, or of the Will, as well as to those which are voluntary and intentional. The only difference between the two classes of movement is that in the case of one of them the purpose is wholly outside the animal, and that in the case of the other class of movement the animal has faculties which make it, however

* Foster's "Text-Book of Physiology," p. 557.

indirectly, a conscious participant or agent in the purpose, or in some part of the purpose, to be subserved. The action of the heart in animals is as certainly "purposive" in its character as the act of eating and deglutition. In the one the animal is wholly passive—has no sensation, no consciousness, however dim. In the other movement the animal is an active agent, is impelled to it by desires which are in the nature of mental affections, and receives from it the appropriate pleasure which belongs to consciousness and sensation. These powers themselves, however, depend, each of them, on certain bits and parts of the animal mechanism; and if these parts can be separately injured or destroyed, it is intelligible enough that consciousness and sensation may be severed for a time from the movements which they ordinarily accompany and direct. The success of such an experiment may teach us much on the details of a general truth which has long been known—that conscious sensation is, so far as our experience goes, inseparably dependent upon the mechanism of an Organic structure. But it cannot in the slightest degree change or modify our conception of what conscious sensation in itself is. It is mechanical exactly in the same sense in which we have long known it to be so—that is to say, it is the result of Life working in and through a structure

which has been made to exhibit and embody certain special gifts and powers.

Considering now that the body of Man is one in structure with the body of all vertebrate animals —considering that, as we rise from the lowest of these to him who is the highest, we see this same structure elaborated into closer and closer likeness, until every part corresponds, bone to bone, tissue to tissue, organ to organ—I cannot doubt that Man is a machine, precisely in the same sense in which animals are machines. If it is no contradiction in terms to speak of a machine which has been made to feel and to see, and to hear and to desire, neither need there be any contradiction in terms in speaking of a machine which has been made to think, and to reflect, and to reason. These are, indeed, powers so much higher than the others that they may be considered as different in kind. But this difference, however great it may be, whether we look at it in its practical results, or as a question of classification, is certainly not a difference which throws any doubt upon the fact that all these higher powers are, equally with the lowest, dependent in this world on special arrangements in a material Organism. It seems to me that the very fact of the question being raised whether Man can be called a machine in the same sense as that in which alone the lower animals can properly be so

described, is a proof that the questioner believes the lower animals to be machines in a sense in which it is not true. Such manifestations of mental attributes as they display are the true and veritable index of powers which are really by them possessed and enjoyed. The notion that, because these powers depend on an Organic Apparatus, they are therefore not what they seem to be, is a mere confusion of thought. On the other hand, when this comes to be thoroughly understood, the notion that Man's peculiar powers are lowered and dishonoured when they are conceived to stand in any similar relation to the body, must be equally abandoned, as partaking of the same fallacy. If the sensation of pleasure and of pain, and the more purely mental manifestations of fear and of affection, have in the lower animals some inseparable connection with an Organic Apparatus, I do not see why we should be jealous of admitting that the still higher powers of self-consciousness and Reason have in Man a similar connection with the same kind of mechanism. The nature of this connection in itself is equally mysterious, and, indeed, inconceivable in either case. As a matter of fact, we have precisely the same evidence as to both. If painful and pleasurable emotions can be destroyed by the cutting of a nerve, so also can the powers of Memory and of Reason be destroyed by any injury or disease

which affects some bits of the substance of the brain.

If, however, the fact of this mysterious connection be so interpreted as to make us alter our conceptions of what self-consciousness, and Reason, and all mental manifestations in themselves are, then indeed we may well be jealous—not of the facts, but of the illogical use which is often made of them. Self-consciousness and Reason and Affection, and Fear, and Pain, and Pleasure, are in themselves exactly what we have always known them to be; and no discovery as to the physical Apparatus with which they are somehow connected can throw the smallest obscurity on the criteria by which they are to be identified as so many different phenomena of Mind. Our old knowledge of the work done is in no way altered by any new information as to the Apparatus by which it is effected. This is the error committed by those who think they can found a new Psychology on the knife. They seem to think that Sensation and Memory, and Reasoning and Will, become something different from that which hitherto we have known them to be, when we have found out that each of these powers may have some special "seat" or "organ" in the body. This, however, is a pure delusion. The known element in Psychology is always the nature of the mental faculty; the unknown element is always the nature

of its connection with any Organ. We know the operations of our own minds with a fulness and reality which does not belong to any other knowledge whatever. We do not know the bond of union between these operations and the brain, except as a sort of external and wholly unintelligible fact. Remembering all this, then, we need not fear or shrink from the admission that Man is a reasoning and self-conscious machine, just in the same sense in which the lower animals are machines which have been made to exhibit and possess certain mental faculties of a lower class.

But what of this? What is the value of this conclusion? Its value would be small indeed if this conception of ourselves as machines could be defended only as a harmless metaphor. But there is far more to be said for it and about it than this. The conception is one which is not only harmless, but profoundly true, as all metaphors are when they are securely rooted in the Homologies of Nature. There is much to be learnt from that aspect of Mind in which we regard its powers as intimately connected with a material Apparatus, and from that aspect of our own bodies in which they are regarded as one in structure with the bodies of the brutes. Surely it would be a strange object of ambition to try to think that we are not included in the vast System of Adjustment which we have thus traced in

them ; that our nobler faculties have no share in the secure and wonderful guarantee which it affords for the truthfulness of all mental gifts. It is well that we should place a high estimate on the superiority of the powers which we possess ; and that the distinction, with all its consequences, between self-conscious Reason and the comparatively simple perceptions of the Beasts, should be ever kept in view. But it is not well that we should omit from that estimate a common element of immense importance which belongs to both, and the value of which becomes immeasurably greater in its connection with our special gifts. That element is the element of Adjustment—the element which suggests the idea of an Apparatus—the element which constitutes all our higher faculties the index and the result of a Pre-adjusted Harmony. In the light of this conception we can see a new meaning in our "place in Nature;" that place which, so far as our bodily Organs are concerned, assigns to us simply a front rank among the creatures which are endowed with Life. It is in virtue of that place and association that we may be best assured that our special gifts have the same relation to the higher realities of Nature which the lower faculties of the Beasts have to the lower realities of the physical world. Whatever we have that is peculiar to ourselves is built up on the same firm foundation on which all Animal Instinct rests.

It is often said that we can never really know what unreasoning Instinct is, because we can never enter into an animal mind, and see what is working there. Men are so apt to be arrogant in philosophy that it seems almost wrong to deprecate even any semblance of the consciousness of ignorance. But it were much to be desired that the modesty of Philosophers would come in the right places. I hold that we can know, and can almost thoroughly understand, the instincts of the lower animals; and this, for the best of all reasons, that we are ourselves animals, whatever more;—having, to a large extent, precisely the same instincts, with the additional power of looking down upon ourselves in this capacity from a higher elevation to which we can ascend at will. Not only are our bodily functions precisely similar to those of the lower animals, —some, like the beating of the heart, being purely "automatic" or involuntary—others being partially, and others again being wholly, under the control of the Will,—but many of our sensations and emotions are obviously the same with the sensations and emotions of the lower animals, connected with precisely the same machinery, presenting precisely the same phenomena, and recognisable by all the same criteria.

It is true that many of our actions become instinctive and mechanical only as the result of a previous intellectual operation of the self-conscious or reason-

ing kind. And this, no doubt, is the origin of the dream that all Instinct, even in the animals, has had the same origin; a dream due to the exaggerated "Anthropomorphism" of those very philosophers who are most apt to denounce this sort of error in others. But Man has many instincts like the animals, to which no such origin in personal experience or in previous reasoning can be assigned. For not only in earliest infancy, but throughout life, we do innumerable things to which we are led by purely organic impulse; things which have indeed a reason and a use, but a reason which we never know, and a use which we never discern, till we come to "think." And how different this process of "thinking" is we know likewise from our own experience. In contemplating the phenomena of reasoning and of conscious deliberation, it really seems as if it were impossible to sever it from the idea of a double Personality. Tennyson's poem of the "Two Voices" is no poetic exaggeration of the duality of which we are conscious when we attend to the mental operations of our own most complex nature. It is as if there were within us one Being always receptive of suggestions, and always responding in the form of impulse—and another Being capable of passing these suggestions in review before it, and of allowing or disallowing the impulses to which they give rise. There is a profound difference between creatures

in which one only of these voices speaks, and Man, whose ears are, as it were, open to them both. The things which we do in obedience to the lower and simpler voice are indeed many, various, and full of a true and wonderful significance. But the things which we do and the affections which we cherish, in obedience to the higher voice, have a rank, a meaning, and a scope which is all their own. There is no indication in the lower animals of this double Personality. There is no indication that they hear any voice but one; and there is every indication that in obeying it the whole law of their Being is perfectly fulfilled. This it is which gives such restfulness to Nature, whose abodes are indeed what Wordsworth calls them—

"Abodes where Self-disturbance hath no part."

On the other hand, the double Personality, the presence of "Two Voices," is never wholly wanting even in the most degraded of human Beings—their thoughts everywhere "accusing or else excusing one another."

Knowing, therefore, in ourselves both these kinds of operation, we can measure the difference between them, and we can thoroughly understand how animals may be able to do all that they actually perform, without ever passing through the processes of argument by which we reach the

conclusions of conscious Reason and of moral Obligation. Moreover, seeing and feeling the difference, we can see and feel the relations which obtain between the two classes of mental work. The plain truth is, that the higher and more complicated work is done, and can only be done in this life, with the materials supplied by the lower and simpler tools. Nay, more, the very highest and most inspiring mental processes. rest upon the lower, as a building rests upon its foundation-stones. The impressions and conceptions which belong to Instinct are like the rude but massive substructions from which some great Temple springs. Not only is the impulse, the disposition, and the ability to reason as purely intuitive and congenital in Man as the disposition to eat, but the fundamental axioms on which all reasoning rests are, and can only be, intuitively perceived. This, indeed, is the essential character of all the axioms or self-evident propositions which are the basis of reasoning, that the truth of them is perceived by an act of apprehension, which, if it depends on any process, depends on a process unconscious, involuntary, and purely automatic. But this is the definition, the only definition, of Instinct or Intuition. All conscious reasoning thus starts from the data which this great Faculty supplies; and all our trust and confidence in the

results of reasoning must depend on our trust and confidence in the Adjusted Harmony which has been established between Instinct and the truths of Nature.

Not only is the idea of mechanism consistent with this confidence, but it is inseparable from it. No firmer ground for that confidence can be given us in thought than this conception,—that as the eye of sense is a mechanism specially adjusted to receive the light of heaven, so is the mental eye a mechanism specially adjusted to perceive those realities which are in the nature of necessary and eternal Truth. Moreover, the same conception helps us to understand the real nature of those limitations upon our faculties which curtail their range, and which yet, in a sense, we may be said partially to overpass in the very act of becoming conscious of them. We see it to be a great law prevailing in the instincts of the lower animals, and in our own, that they are true not only as guiding the animal rightly to the satisfaction of whatever appetite is immediately concerned, but true also as ministering to ends of which the animal knows nothing, although they are ends of the highest importance, both in its own economy and in the far-off economies of Creation. In direct proportion as our own minds and intellects partake of the same nature, and are founded on the same principle of Adjustment, we

may feel assured that the same law prevails in their nobler work and functions. And the glorious law is no less than this—that the work of Instinct is true not only for the short way it goes, but for that infinite distance into which it leads in a right direction.

I know no argument better fitted than this to dispel the sickly dreams, the morbid misgivings, of the Agnostic. Nor do I know of any other conception as securely founded on science, properly so called, which better serves to render intelligible and to bring within the familiar analogies of Nature those higher and rarer mental gifts which we know as Genius, and even that highest and rarest of all which we understand as Inspiration. That the human Mind is always in some degree, and that certain individual minds have been in a special degree, reflecting surfaces, as it were, for the verities of the unseen and eternal world, is a conception having all the characters of coherence which assure us of its harmony with the general constitution and the common course of things.

And so this doctrine of Animal Automatism—the notion that the Mind of Man is indeed a structure and a mechanism—a notion which is held over our heads as a terror and a doubt—becomes, when closely scrutinised, the most comforting and reassuring of all conceptions. No stronger assur-

ance can be given us that our Faculties, when rightly used, are Powers on which we can indeed rely. It reveals what may be called the strong physical foundations on which the truthfulness of Reason rests. And more than this—it clothes with the like character of trustworthiness every instinctive and intuitive affection of the human soul. It roots the reasonableness of Faith in our conviction of the Unities of Nature. It tells us that as we know the instincts of the lower animals to be the index and the result of Laws which are out of sight to them, so also have our own higher instincts the same relation to Truths which are of corresponding dignity and of corresponding scope.

Nor can this conception of the Mind of Man being connected with an adjusted mechanism cast, as has been suggested, any doubt on the freedom of the Will—such as by the direct evidence of consciousness, we know that freedom to be. This suggestion is simply a repetition of the same inveterate confusion of thought which has been exposed before. The question what our powers are is in no way affected by the admission or discovery that they are all connected with an Apparatus. Consciousness does not tell us that we stand unrelated to the System of things of which we form a part. We dream—or rather we simply

rave—if we think we are free to choose among things which are not presented to our choice,—or if we think that choice itself can be free from motives,—or if we think that we can find any motive outside the number of those to which by the structure of our Mind and of its Organ we have been made accessible. The only freedom of which we are really conscious is freedom from compulsion in choosing among things which are presented to our choice,—consciousness also attesting the fact that among those things some are coincident and some are not coincident with acknowledged Obligation. This, and all other direct perceptions, are not weakened but confirmed by the doctrine that our minds are connected with an Adjusted Mechanism. Because the first result of this conception is to establish the evidence of consciousness when given under healthy conditions, and when properly ascertained, as necessarily the best and the nearest representation of the truth. This it does in recognising ourselves, and all the faculties we possess, to be nothing but the result and index of an Adjustment contrived by and reflecting the Mind which is supreme in Nature. We are derived and not original. We have been created, or—if any one likes the phrase better—we have been "evolved;" not, however, out of nothing, nor out of confusion,

nor out of lies,—but out of "Nature," which is but a word for the whole Sum and System of intelligible things—the embodiment of all Order, the expression of all Truth—the issue of the Fountain in which all fulness dwells.

CHAPTER IV.

On the Limits of Human Knowledge considered with Reference to the Unity of Nature.

AND yet, although it is to Nature in this highest and widest sense that we belong—although it is out of this fountain that we have come, and it is out of its fulness that we have received all that we have and are, men have doubted, and will doubt again, whether we can be sure of anything concerning it.

If this terrible misgiving had affected individual minds alone in moments of weariness and despair, there would have been little to say about it. Such moments may come to all of us, and the distrust which they leave behind them may be the sorest of human trials. It is no unusual result of abortive yet natural effort, and of innate yet baffled curiosity. But this doubt, which is really nothing more than a morbid effect of weakness and fatigue, has been

embraced as a doctrine and systematised into a Philosophy. Nor can it be denied that there are some partial aspects of our knowledge in which its very elements seem to dissolve and disappear under the power of self-analysis, so that the sum of it is reduced to little more than a consciousness of ignorance. All that we know of Matter is so different from all that we are conscious of in Mind, that the relations between the two are really incomprehensible and inconceivable to us. Hence this relation constitutes a region of darkness in which it is easy to lose ourselves in an abyss of utter scepticism. What proof have we—it has been often asked—that the mental impressions we derive from objects are in any way like the truth? We know only the phenomena, not the reality of things. We are conversant with things as they appear, not with things as they are "in themselves." What proof have we that these phenomena give us any real knowledge of the truth? How, indeed, is it possible that knowledge so "relative" and so "conditioned"—relative to a mind so limited, and conditioned by senses which tell us of nothing but sensations—how can such knowledge be accepted as substantial? Is it not plain that our conceptions of Creation and of a Creator are all mere "Anthropomorphism?" Is it not our own shadow that we are always chasing? Is it not a mere bigger

image of ourselves to which we are always bowing down?

It is upon suggestions such as these that the Agnostic philosophy, or the philosophy of Nescience, is founded—the doctrine that, concerning all the highest problems which it both interests and concerns us most to know, we never can have any knowledge or any rational and assured belief.

It may be well to come to the consideration of this doctrine along those avenues of approach which start from the conception we have now gained of the Unity of Nature.

Nothing, certainly, in the human Mind is more wonderful than this—that it is conscious of its own limitations. For it is to be observed that such consciousness would be impossible if these limitations were in their nature absolute. The bars which we feel so much, and against which we so often beat in vain, are bars which could not be felt at all unless there were something in us which seeks a wider scope. It is as if these bars were a limit of opportunity rather than a boundary of power. No absolute limitation of mental faculty ever is, or ever could be, felt by the creatures whom it affects. Of this we have abundant evidence in the lower animals, and in those lower faculties of our own nature which are of like kind to theirs. Our bodily appetites can seek nothing beyond or beside the objects of

their desire. To the attainment of these objects that desire is limited, and with this attainment it is satisfied. Moreover, when a bodily appetite is satisfied, it for the time ceases to exist, and may even be converted into nausea and disgust towards that which had been the object of pursuit. This is the necessary effect of a limitation which is absolute. But the case is very different with the appetites of the Mind, and still more with the cravings of the Spirit. Even in the purest physical investigations we are perpetually encountering some mental barrier through which we cannot break, and over which we cannot see. And yet we know it and feel it to be a barrier and nothing more. We stop in front of it not because we are satisfied, but because it bars our way. Not only do we know that there is something on the other side, but we know that the things on the other side are so closely related to the things on this side that without some vision of them we cannot really understand even the things we see. We feel our own ignorance, and our own helplessness, not because we have reached, but because we cannot reach, the limits of our intellectual powers, and because the desires which correspond to them are consequently left unsatisfied. This is the difference between ourselves and the lower animals. We can perfectly understand the absolute limitations under which they lie, because in many of our lower

faculties we share these limitations with the Beasts. All their powers and many of our own are exerted without any sense of limitation, and this because of the very fact that the limitation of them is absolute and complete. In their own nature they admit of no larger use. The field of effort and of attainable enjoyment is, as regards them, co-extensive with the whole field in view. Nothing is seen, or felt, or wished for by them which may not be possessed. In such possession all exertion ends, and all desire is satisfied. This is the law of every faculty subject to a limit which is absolute; and where this law does not apply, there we may be sure that the limitation is not absolute but conditional.

Now this is the state of things in respect to all the higher faculties of the human Mind, when viewed in relation to the objects of their desire. These objects are never attained fully, and as a necessary consequence that desire is never wholly satisfied. Not only do we know vaguely that there are things of which we are ignorant, but very often we know precisely what it is that we ask, and ask in vain. Moreover, the questions which excite our interest most, and which we feel to be most insoluble, are precisely those which most nearly concern ourselves. Not to speak of the connection of the Body and the Mind, not to speak of the nature of Life, or still more of the nature of Death,—the simplest questions connected with our own Organisation are unanswered

and unanswerable. Science gives us no help, because the explanations which to it are ultimate are not ultimate at all to the faculties which seek for more light concerning them. The very language of science is, in this respect, often more deceptive than helpful, inasmuch as it is the fashion of scientific men to pass off as explanations, the mere re-statement of facts concealed under words derived from the dead languages. Perhaps it is all that they can do: but at least the poverty of the device should be seen and known. The "atoms" and the "molecules"—the "cells" and the "differentiated structures"—are these the builders,—or are they only the bricks and stones? And the Forces and the Energies which work in these and upon these, what are they? And if these are undying and inexhaustible, how are all the forms in which they are embodied so fugitive and evanescent? Our desire of knowing these things is more intense in proportion to the overwhelming interest which our faculties do feel and recognise as belonging to them. In the contrast between the eagerness of these appetites of the Mind, and the conscious weakness of the powers by which they can be satisfied, we see a condition of things on which the Unity of Nature throws an important light. In physics, the existence of any pressure is the index of a "potential energy" which, though it may be doing no work, is yet always capable of doing it. And so in the intellectual world, the sense of pressure and confinement is the in-

dex of powers which under other conditions are capable of doing what they cannot do at present. It is in these conditions that the barrier consists, and at least to a large extent they are external. What we feel, in short, is less an incapacity than a restraint.

So much undoubtedly is to be said as to the nature of those limitations on our mental powers of which we are conscious. And the considerations thus presented to us are of immense importance in qualifying the conclusions to be drawn from the facts of consciousness. They do not justify, although they may account for, any feeling of despair as to the ultimate accessibility of that knowledge which we so much desire. On the contrary, they suggest the idea that there is within us a Reserve of Power to some unknown and indefinite extent. It is as if we could understand indefinitely more than we can discover, if only some higher Intelligence would explain it to us.

But if it is of importance to take note of this Reserve of Power of which we are conscious in ourselves, it is at least of equal importance to estimate aright the conceptions to which we can and do attain without drawing upon this Reserve at all. Not only are the bars confining us bars which we can conceive removed, but they are bars which in certain directions offer no impediment at all to a boundless range of vision. Perhaps there is no subject on which the fallacies of philosophic phrase-

ology have led to greater errors. "That the Finite cannot comprehend the Infinite," is a proposition constantly propounded as an undoubted and all-comprehensive truth. Such truth as does belong to it seems to come from the domain of Physics, in which it represents the axiom that a part cannot be equal to the whole. From this, in the domain of Mind, it comes to represent the truth, equally undeniable, that we cannot know all that Infinity contains. But the meaning into which it is liable to pass when applied to Mind is that Man cannot conceive Infinity. And never was any proposition so commonly accepted which, in this sense, is so absolutely devoid of all foundation. Not only is Infinity conceivable by us, but it is inseparable from conceptions which are of all others the most familiar. Both the great conceptions of Space and Time are, in their very nature, infinite. We cannot conceive of either of these as subject to limitation. We cannot conceive of a moment after which there shall be no more Time, nor of a boundary beyond which there is no more Space. This means that we cannot but think of Space as infinite, and of Time as everlasting.

If these two conceptions stood alone they would be enough; for in regard to them the only incapacity under which we labour is the incapacity to conceive the Finite. All the divisions of Space and Time with which we are so familiar,—our days and

months and years, and our various units of distance, —we can only think of as bits and fragments of a whole which is illimitable. And although these great conceptions of Space and Time are possibly the only conceptions to which the idea of infinity attaches as an absolute necessity of Thought, they are by no means the only conceptions to which the same idea can be attached, and probably ought to be so. The conception of Matter is one, and the conception of Force* is another, to which we do not perhaps attach, as of necessity, the idea of indestructibility, or the idea of eternal existence and of infinite extension. But it is remarkable that in exact proportion as science advances, we are coming to understand that both of these are conceptions to which the idea of infinity not only may be, but ought to be attached. That is to say, that the eternal existence of Matter and the eternal duration of Force are not only conceivable but true. Nay, it may be our ignorance alone that makes us think we can conceive the contrary. It is possible to conceive of Space being utterly devoid of Matter, only perhaps because we are accustomed to see and to think of spaces which are

* I use the word "Force" as the cause or source of "Energy." Professor Tait now maintains that Force has no real or objective existence. But the arguments for this proposition would be equally valid against the "reality" of Sound and of Light, and of other things for which we must have a name. In all these cases the name or the word denotes, not a "thing," but a group of relations among "things." This however is equally true of "Energy." See a Paper "On the Reality of Force," by W. R. Browne, C.E., *Phil. Mag.*, Nov. 1883.

indeed empty of visible substances. We can expel also the invisible substances or gases of the atmosphere, and we can speak and think of the result as a "vacuum." But we know now that when air and all other terrestrial gases are gone the luminiferous medium remains; and so far as we have means of knowing, this medium is ubiquitous and omnipresent in the whole Universe of Space. In like manner we are accustomed to see solid matter so dissipated as to be invisible, intangible, and wholly imperceptible; and therefore we think we can imagine Matter to be really destructible. But the more we know of it, the more certain we become that it cannot be destroyed, and can only be redistributed. In like manner, in regard to Force, we are accustomed to see Matter in what is called statical equilibrium —that is to say, at rest; and so perhaps we think we can conceive the cessation or extinction of Force. But here again the progress of research is tending more and more to attach irrevocably the idea of indestructibility—that is, of eternal existence —to that which we know as Force.

The truth is, that this conception is really implicitly involved in the conception of the indestructibility of Matter. For all that we know of Matter is inseparably connected with the Forces which it exerts, or which it is capable of exerting, or which are being exerted in it. The force of gravitation seems to be all-pervading, and to be either an

inherent power or property in every kind, or almost every kind of Matter,* or else to be the result of some kind of energy which is universal and unquenchable. All bodies, however passive and inert they may seem to be under certain conditions, yet indicate by their very existence the power of those molecular forces to which the cohesion of their atoms is due. The fact is now familiar to us that the most perfect stillness and apparent rest in many forms of Matter, is but the result of a balance or equilibrium maintained between forces of the most tremendous energy, which are ready to burst forth at a moment's notice, when the conditions are changed under which that balance is maintained. And this principle, which has become familiar in the case of what are called explosive substances, because of the ease and the certainty with which the balanced forces can be liberated, is a principle which really prevails in the composition of all material substances whatever; the only difference being that the energies by which their molecules are held together are so held under conditions which are more stable—conditions which it is much more difficult to change—and conditions, therefore, which conceal from us the universal prevalence and power of Force in the constitu-

* So far as known the luminiferous medium is not ponderable. But, on the other hand, it is, not improbably, concerned in gravitation as a cause.

tion of the material Universe. It is, therefore, distinctly the tendency of science more and more to impress us with the idea of the unlimited duration and indestructible nature both of Matter and of the energies which work in it and upon it.

One of the scientific forms under which this idea is expressed is the Conservation of Energy. It affirms that though we often see moving bodies stopped in their course, and the energy with which they move apparently extinguished, no such extinction is really effected. It affirms that this energy is merely transformed into other kinds of motion, which may or may not be visible, but which, whether visible or not, do always really survive the motion which has been arrested. It affirms, in short, that Energy, like Matter, of which indeed it is but an incident and an attribute, cannot be destroyed or lessened in quantity, but can only be redistributed.

As, however, the whole existing Order of Nature depends on very special distributions and concentrations of Force, this doctrine affords no ground for presuming on the permanence, or even on the prolonged continuance, of that Order. Quite the contrary; for another general conception has been attained from science which at first sight appears to be a contradiction of the doctrine of "Conservation of Energy"—namely, the "Dissipation of Energy." This doctrine, however, does not affirm

that Energy can be dissipated in the sense of being wholly lost or finally extinguished. It only affirms that all the existing concentrations and arrangements of Force are marked as temporary—that they are being gradually exhausted, and that the forces concerned in them are being diffused (generally in the form of Heat) more and more equally over the infinitudes of Matter and of Space.

Closely connected with, if indeed it be not a necessary part and consequence of, these conceptions of the infinity of Space and Time, of Matter and of Force, is the more general concept of Causation.

It is impossible to conceive of anything happening without a cause. Even if we could conceive the utter destruction or annihilation of any particular force, or form of Force, we cannot conceive of this very destruction happening except as the effect of some cause. All attempts to reduce this idea of Causation to other and lower terms have been worse than futile. They have uniformly left out something which is of the very essence of the idea. The notion of "uniform antecedence" is not equivalent. "Necessary antecedence" is more near the mark. These words do indeed indicate the essential element in the idea with tolerable clearness. But like all other simple fundamental conceptions, the idea of Causation defies analysis. As, however, we cannot dissociate the idea of Causation from the idea of Force or of

Energy, it may perhaps be said that the indestructibility or eternal duration of Force is a physical doctrine which gives strength and substance to the metaphysical concept of Causation. Science may discover, and indeed has already discovered, that as regards our application of the idea of cause, and of the correlative idea of effect, to particular cases of sequence, there is often some apparent confusion arising from the fact that the relative positions of cause and effect may be interchangeable, so that A, which at one moment appears as the cause of B, becomes at another moment the consequence of B, and not its cause. Thus Heat is very often the cause of visible Motion, and visible Motion is again the cause of Heat. And so of the whole cycle of Physical Forces, which Sir W. Grove and others have proved to be "correlated"—that is, to be so intimately related that each may in turn produce or pass into all the others. But this does not really obscure or cast any doubt upon the truth of our idea of Causation. On the contrary, that idea is confirmed in receiving a new interpretation, and in the disclosure of physical facts involving the same conception. The necessity of the connection between an effect and its cause receives an unexpected confirmation when it comes to be regarded as simply the necessary passing of an energy which is universal and indestructible from one form of action

into another. Heat becomes the cause of Light because it is the same energy working in a special medium. Conversely Light becomes the cause of Heat, because again the same energy passes into another medium and there produces a different effect. And so all the so-called "Correlated Forces" may be interchangeably the cause or the consequence of each other, according to the order of time in which the changes of form are seen. This, however, does not confound, but only illustrates the ineradicable conviction that for all such changes there must be a cause. It may be perfectly true that all these Correlated Forces can be ideally reduced to different "forms of motion;" but Motion itself is inconceivable except as existing in Matter, and as the result of some moving force. Every difference of direction in the motion or in the form of Matter implies a change, and we can conceive no change without a cause—that is to say, apart from the operation of some condition without which that change would not have been.

The same ultimate conceptions, and no other, appear to constitute all the truth that is to be found in a favourite doctrine among the cultivators of physical science—the so-called "Law of Continuity." This phrase is indeed often used with such looseness of meaning that it is extremely difficult to understand the primary signification attached to it.

One common definition, or rather one common illustration, of this law is said to be that Nature does nothing suddenly—nothing "per saltum." Of course this can only be accepted under some metaphorical or transcendental meaning. In Nature there is such a thing as a flash of lightning, and this is generally recognised as sufficiently sudden. A great many other exertions of electric force are of similar rapidity. The action of Chemical Affinity is always rapid, and very often even instantaneous. Yet these are among the most common and the most powerful factors in the mechanism of Nature. They have the most intimate connection with the phenomena of Life, and we know only too well that in these the profoundest changes are often determined in moments of time. For many purposes to which this so-called "Law of Continuity" is often applied in argument no idler dogma was ever invented in the schools. There is a common superstition that this so-called law shuts out the idea of Creation, and negatives the possibility, for example, of the sudden appearance of new Forms of Life. What it does negative, however, is not any appearance which is sudden, but only any appearance which has been unprepared. But these are two very different conceptions, although they are conceptions very easily confounded. Innumerable things may come to be, in a moment—in the twink-

ling of an eye. But nothing can come to be without a long, even if it be a secret, history. The "Law of Continuity" is, therefore, a phrase of ambiguous meaning; but at the bottom of it there lies the true and invincible conviction that for every change, however sudden—for every "leap," however wide—there has always been a long chain of predetermining causes, and that even the most tremendous bursts of Energy and the most sudden exhibitions of Force have all been slowly and silently prepared. In this sense the Law of Continuity is nothing but the idea of Causation. It is founded on the necessary duration which we cannot but attribute to the existence of Force, and this appears to be the only truth which the Law of Continuity represents.

When now we consider the place in the whole system of our knowledge which is occupied by these great fundamental conceptions of Time and Space, and of Matter and of Force, and when we consider that we cannot even think of any one of these realities as capable of coming to an end, we may well be assured that, whatever may be the limits of the human Mind, they certainly do not prevent us from apprehending Infinity. On the contrary, it would rather appear that this apprehension is the invariable and necessary result of every investigation of Nature.

It is indeed of the highest importance to observe that some of these conceptions, especially the in-

destructibility of Matter and of Force, belong to the domain of science. That is to say, the systematic examination of natural phenomena has given them a distinctness and a consistency which they never possessed before. As now accepted and defined, they are the result of direct experiment. And yet, strictly speaking, all that experiment can do is to prove that in all the cases in which either Matter or Force seems to be destroyed, no such destruction has taken place. Here then we have a very limited and imperfect amount of "experience" giving rise to an infinite conception. But it is another of the suggestions of the Agnostic philosophy that this can never be a legitimate result. Nevertheless, it is a fact, that these conceptions have been reached. They are now universally accepted and taught as truths lying at the foundation of every branch of natural science—at once the beginning and the end of every physical investigation. They are not what are ordinarily called "laws." They stand on much higher ground. They stand behind and before every law, whether that word be taken to mean simply an observed order of facts, or some particular force to which that order is due, or some combinations of force for the discharge of function, or some abstract definition of observed phenomena such as the "laws of motion." * All these, though they may be

* For the fuller definition of the senses in which "Law" is used, see "Reign of Law," Chap. I.

"invariable" so far as we can see, carry with them no character of universal or necessary truth—no conviction that they are and must be true in all places and for all time. There is no existing order —no present combination of Matter or of Force —which we cannot conceive coming to an end. But when that end is come, we cannot conceive but that something must remain,—if it be nothing else than that by which the ending was brought about, or, as it were, the raw materials of the creation which has passed away.

That this conception, when once suggested and clearly apprehended, cannot be eradicated, is one of the most indisputable facts of instructed consciousness. That no possible amount of mere external observation or experiment can cover the infinitude of the conclusion is also unquestionably true. But if "experience" is to be upheld as in any sense the ground and basis of all our knowledge, it must be understood as embracing that most important of all kinds of experience in the study of Nature—the experience we have of the laws of Mind. It is one of the most certain of those laws, that in proportion as the powers of the understanding are well developed, and are prepared by previous training for the interpretation of natural facts, there is no relation whatever between the time occupied in the observation

of phenomena and the breadth or sweep of the conclusions which may be arrived at from them. A single glance, lasting not above a moment, may awaken the recognition of truths as wide as the Universe and as everlasting as Time itself. Nay, it has often happened in the history of science that such recognitions of general truths have been reached by no other kind of observation than that of the Mind becoming conscious of its own innate perceptions. Conceptions of this nature have perpetually gone before experiment—have suggested it, guided it,—and have received nothing more than corroboration from it. I do not say that these conceptions have been reached without any process. But the process has been to a large extent as unconscious as that by which we see the light. I do not say they have been reached without "experience," even in that narrow sense in which it means the observation of external things. But the experience has been nothing more than the act of living in the world, and of breathing in it, and of looking round upon it. These conceptions have come to Man because he is a Being in harmony with surrounding Nature. The human Mind has opened to them as a bud opens to the sun and air.

So true is this, that when reasons have been given for the conclusions thus arrived at—these reasons have often been quite erroneous. Nothing in the

history of Philosophy is more curious than the close correspondence between many ideas enunciated by the ancients as the result of speculation, and some, at least, of the ideas now prevalent as the result of science. It is true that the ancients expressed them vaguely, associated them with other conceptions which are wide of the truth, and quoted in support of them illustrations which are often childish. Nevertheless, the fact remains that they had attained to some central truths, however obscured the perception may have been by ignorance of the more precise and accurate analogies by which they can be best explained, and which only the process of observation has revealed. "They had in some way grasped," says Mr. Balfour Stewart,* "the idea of the essential unrest and energy of things. They had also the idea of small particles or atoms; and finally of a medium of some sort, so that they were not wholly ignorant of the most profound and deeply seated of the principles of the material universe." There is but one explanation of this, but it is all-sufficient. It is that the Mind of Man is a part, and one at least of the highest parts, of the System of the Universe—the result of mechanism specially adapted to the purpose of catching and translating into

* "Conservation of Energy," p. 135.

thought the light of truth as embodied in surrounding Nature.

We have seen that the foundations of all conscious reasoning are to be found in certain propositions which we call self-evident,—that is to say, in propositions the truth of which is intuitively perceived. We have seen, too, as a general law affecting all manifestations of Life or Mind, even in its very lowest forms, that instinctive or intuitional perceptions are the expression and the index of other and larger truths which lie entirely beyond the range of the perception or of the intuition which is immediately concerned. This law holds good quite as much of the higher intuitions which are peculiar to Man as of the mere intuitions of sensation which are common to him and to the animals beneath him. The lowest Savage does many things by mere instinct which contain implicitly truths of a very abstract nature—truths of which, as such, he has not the remotest conception, and which in the present undeveloped condition of his faculties it would be impossible to explain to him. Thus, when he goes into the forest to cut a branch fit for being made into a bow, or when he goes to the marsh to cut a reed fit for being made into an arrow, and when in doing so he cuts them of the proper length by measuring them with the bows and arrows which he already has, in this

simple operation he is acting on the abstract and most fruitful truth that "things equal to the same thing are equal to one another." This is one of the axioms which lie at the basis of all mathematical demonstration. But as a general, universal, and necessary truth the Savage knows nothing of it—as little as he knows of the wonderful consequences to which it will some day lead his children or descendants. So in like manner when the Savage designs, as he often does, most ingenious traps for the capture of his prey, and so baits them as to attract the animals he desires to catch, he is counting first on the constancy and uniformity of Physical Causation, and, secondly, on the profoundly different action of the motives which determine the conduct of creatures having Life and Will. But of neither of these as general truths does he know anything; and of one of them, at least, not even the greatest philosophers have reached the full depth or meaning. Nevertheless, it would be a great error to suppose that the Savage, because he has no conception of the general truth involved in his conduct, has been guided in that conduct by anything in the nature of chance or accident. His intuitions have been right, and have involved so much perception of truth as is necessary to carry him along the little way he requires to travel, because the Mind in which those intuitions lie is a product and

a part of Nature—a product and part of that great System of things which is held together by laws intelligible to Mind—laws which the human mind has been constructed to feel even when it cannot clearly see. Moreover, when these laws come to be clearly seen, they are seen only because the Mind has Organs adjusted to the perception of them, and because it finds in its own mechanism corresponding sequences of thought.

It was the work of a great German metaphysician towards the close of the last century to discriminate and define more systematically than had been done before some at least of those higher elements of thought which, over and above the mere perception of external things, the Mind thus contributes out of its own structure to the fabric of knowledge. In doing this he did immortal service—proving that when men talked of "experience" being the only source of knowledge, they forgot that the whole process of experience presupposes the action of innate laws of thought, without which experience can neither gather its facts nor reach their interpretation. "Experience," as Kant most truly said, is nothing but a "synthesis of Intuitions"—a building up or putting together of conceptions which the access of external Nature finds ready to be awakened in the Mind. The whole of this building process is determined by the Mind's

own laws—a process in which even observation of outward fact must take its place according to those principles of arrangement in which alone all explanation of them consists, and out of which any understanding of them is impossible.

And yet this great fact of a large part of our knowledge—and that the most important part—coming to us out of the very furniture and constitution of the Mind itself, has been so expressed and presented in the language of philosophy as rather to undermine than to establish our confidence in the certainty of knowledge. For if the Mind is so spoken of and represented as to suggest the idea of something apart from the general System of Nature, and if its laws of thought are looked upon as "forms" or moulds into which, by some artificial arrangement or by some mechanical necessity, everything from outside must be squeezed and made to fit—then it will naturally occur to us to doubt whether conceptions cut out and manufactured under such conditions can be any trustworthy representation of the truth. Such, unfortunately, has been the mode of representation adopted by many philosophers—and such accordingly has been the result of their teaching. This is the great source of error in every form of the Idealistic philosophy, but it is a source of error which can be perfectly eliminated, leaving untouched and undoubted the

large body of truths which has made that philosophy attractive to so many powerful minds. We have only to take care that in expressing those truths we do not use metaphors which are misleading. We have only to remember that we must regard the Mind and the laws of its operation in the light of that most assured truth—the Unity of Nature. Then, indeed, we shall come to see that the Mind has no "moulds" which have not themselves been moulded on the realities of the Universe—no "forms" which it did not receive as a part and a consequence of its Unity with the rest of Nature. Its conceptions are not manufactured; they are developed. They are not made; they simply grow. The order of thought under which the human Mind renders intelligible to itself all the phenomena of the Universe, is not an order which it invents, but an order which it simply feels and sees. And this "vision and faculty divine" is a necessary consequence of its congenital relations with the whole System of Nature—from being bone of its bone, flesh of its flesh—from breathing its atmosphere, from living in its light, and from having with it a thousand points of contact visible and invisible, more than we can number or understand.

And yet so subtle are the suggestions of the human Spirit in disparagement of its own powers—

so near and ever present to us is that region which belongs to the unsatisfied Reserve of Power—that the very fact of our knowledge arising out of our Organic relations with the rest of Nature has been seized upon as only casting new discredit on all that we seem to know. Because all our knowledge arises out of these relations, therefore, it is said, all our knowledge of things must be itself "relative;" and relative knowledge is not knowledge of "things in themselves." Such is the argument of metaphysicians—an argument repeated with singular unanimity by philosophers of almost every school of thought. By some it has been made the basis of religious proof. By some it has been made the basis of a reasoned scepticism. By others it has been used simply to foil attacks upon belief. The real truth is that it is an argument useless for any purpose whatever, because it is not itself true. The distinction between knowledge of things in their relations, and knowledge of things "in themselves," is a distinction without a meaning. In metaphysics the assertion that we can never attain to any knowledge of things "in themselves" does not mean simply that we know things only in a few relations out of many. It does not mean even that there may be and probably are a great many relations which we have not faculties enabling us to conceive. All this is quite true, and a most important

truth. But the metaphysical distinction is quite different. It affirms that if we knew things in every one of the relations that affect them, we should still be no nearer than before to a knowledge of "things in themselves." "It is proper to observe," says Sir W. Hamilton, "that had we faculties equal in number to all the possible modes of existence, whether of Mind or Matter, still would our knowledge of Mind or Matter be only relative. If material existence could exhibit ten thousand phenomena—if we possessed ten thousand senses to apprehend these ten thousand phenomena of material existence, of existence absolutely and in itself, we should then be as ignorant as we are at present." * The conception here is that there is something to be known about things in which they are not presented as in any relation to anything else. It affirms that there are certain ultimate entities in Nature to which all phenomena are due, and yet which can be thought of as having no relation to these phenomena, or to ourselves or to any other existence whatever.

Now, as the very idea of knowledge consists in the perception of relations, this affirmation is, in the purest sense of the word, nonsense—that is to say, it is a series of words which have either no meaning at all or a meaning which is self-contradictory. It

* "Lectures," vol. i. p. 145.

belongs to the class of propositions which throw just discredit on metaphysics—mere verbal propositions, pretending to deal with conceptions which are no conceptions at all, but empty sounds. The "unconditioned," we are told, "is unthinkable:" but words which are unthinkable had better be also unspeakable, or at least unspoken. It is altogether untrue that we are compelled to believe in the existence of anything which is "unconditioned"—in Matter with no qualities—in Minds with no character—in a God with no attributes. Even the metaphysicians who dwell on this distinction between the Relative and the Unconditioned admit that it is one to which no idea can be attached. Yet, in spite of this admission, they proceed to found many inferences upon it, as if it had an intelligible meaning. Those who have not been accustomed to metaphysical literature could hardly believe the flagrant unreason which is common on this subject. It cannot be better illustrated than by quoting the words in which this favourite doctrine is expressed by Sir William Hamilton. Speaking of our knowledge of Matter he says: "It is a name for something known—for that which appears to us under the forms of extension, solidity, divisibility, figure, motion, roughness, smoothness, colour, heat, cold," &c. "But," he goes on to say, "as these phenomena appear

only in conjunction, we are compelled by the constitution of our nature to think them conjoined in and by something; and as they are phenomena, we cannot think them the phenomena of nothing, but must regard them as the properties or qualities of something that is extended, figured, &c. But this something, absolutely and in itself—*i.e.*, considered apart from its phenomena—is to us as Zero. It is only in its qualities, only in its effects, in its relative or phenomenal existence, that it is cognisable or conceivable; and it is only by a law of thought which compels us to think something absolute and unknown, as the basis or condition of the relative and known, that this something obtains a kind of incomprehensible reality to us." The argument here is that because phenomena are and must be the "properties or qualities of something else," therefore we are "compelled to think" of that something as having an existence separable from any relation to its own qualities and properties, and that this something acquires from this reasoning a "kind of incomprehensible reality!" The answer to all this is—there is no such law of thought. There is no such necessity of thinking nonsense as is here alleged. All that we are compelled to think is that the ultimate constitution of Matter, and the ultimate source of its relations to our own Organism, are unknown, and are probably inaccessible to us. But

this is a very different conception from that which affirms that if we did know or could know these ultimate truths we should find in them anything standing absolutely alone and unrelated to other existences in the Universe.

It is, however, so important that we should define to ourselves as clearly as we can the nature of the limitations which affect our knowledge, and the real inferences which are to be derived from the consciousness we have of them, that it may be well to examine these dicta of metaphysicians in the light of specific instances. It becomes all the more important to do so when we observe that the language in which these dicta are expressed generally implies that knowledge which is "only relative" is less genuine or less absolutely true than some other kind of knowledge which is not explained, except that it must be knowledge of that which has no relation to the Mind.

There is a sense (and it is the only sense in which the words have any meaning) in which we are all accustomed to say that we know a thing "in itself," when we have found out, for example, its origin, or its structure, or its chemical composition, as distinguished from its more superficial aspects. If a new substance were offered to us as food, and if we examined its appearance to the eye, and felt its consistency to the touch, and smelt its odour, and

finally tasted it, we should then know as much about it as these various senses could tell us. Other senses, or other forms of sensation, might soon add their own several contributions to our knowledge, and we might discover that this substance had deleterious effects upon the human Organism. This would be knowing, perhaps, by far the most important things that are to be known about it. But we should certainly like to know more, and we should probably consider that we had found out what it was "in itself," when we had discovered farther, for example, that it was the fruit of a tree. Chemistry might next inform us of the analysis of the fruit, and might exhibit some alkaloid to which its peculiar properties and its peculiar effects upon the body are due. This, again, we should certainly consider as knowing what it is "in itself." But other questions respecting it would remain behind. How the tree can extract this alkaloid from the inorganic elements of the soil, and how, when so extracted, it should have such and such peculiar effects upon the animal body; these, and similar questions, we may ask, and probably we shall ask in vain. But there is nothing in the inaccessibility of this knowledge to suggest that we are absolutely incapable of understanding the answer if it were explained to us. On the contrary, the disposition we have to put

such questions raises a strong presumption that the answer would be one capable of that assimilation by our intellectual nature in which all understanding of anything consists. There is nothing in the series of phenomena which this substance has exhibited to us—nothing in the questions which they raise which can even suggest the idea that all these relations which we have traced, or any others which may remain behind, are the result of something which can be thought of or conceived as neither a cause nor a consequence—but solitary and unrelated. On the contrary, all that remains unexplained is the nature and cause of its relations —its relations on the one hand to the elements out of which vegetable Vitality has combined it, and its relations on the other hand to the still higher Vitality which it threatens to destroy. Its place in the Unity of Nature is the ultimate object of our search, and this unity is essentially a unity of relations, and of nothing else. That Unity everywhere proclaims the truth that there is nothing in the wide Universe which stands unrelated to the rest.

Let us take another example. Until modern science had established its methods of physical investigation, Light and Sound were known as sensations only. That is to say, they were known in terms of the mental impressions which they

immediately produce upon us, and in no other terms whatever. There was no proof that in these sensations we had any knowledge "in themselves" of the external agencies which produce them. But now all this is changed. Science has discovered what these two agencies are "in themselves;"—that is to say, it has defined them under aspects which are totally distinct from seeing or hearing, and is able to describe them in terms addressed to wholly different faculties of conception. Both Light and Sound are in the nature of undulatory movements in elastic media —to which undulations our Organs of sight and hearing are respectively adjusted or "attuned." In these Organs, by virtue of that adjustment or attuning, these same undulations are "translated" into the sensations which we know. It thus appears that the facts as described to us in this language of sensation are the true equivalent of the facts as described in the very different language of intellectual analysis. The eye is now understood to be an Apparatus for enabling the Mind instantaneously to appreciate differences of motion which are of almost inconceivable minuteness. The pleasure we derive from the harmonies of colour and of sound, although mere sensations, do correctly represent the movement of undulations in a definite order; whilst those other sensations

which we know as discords represent the actual clashing and disorder of interfering waves.

Thus it is that in breathing the healthy air of physical discoveries such as these, although the limitations of our knowledge continually haunt us, we gain nevertheless a triumphant sense of its certainty and of its truth. Not only are the mental impressions which our Organs have been so constructed as to convey, proved to be a true interpretation of external facts, but the conclusions we draw as to their origin and their source, and as to the guarantee we have for the accuracy of our conceptions, are placed on the firmest of all foundations. The mirror into which we look is a true mirror, reflecting accurately and with infinite fineness the realities of Nature. And this great lesson is being repeated in every new discovery, and in every new application of an old one. Every reduction of phenomena to ascertained measures of force; every application of mathematical proof to theoretical conceptions; every detection of identical operations in diverse departments of Nature; every subjection of material agencies to the service of Mankind; every confirmation of knowledge acquired through one sense by the evidence of another;—each and all of these operations add to the verifications of science, confirm our reasonable trust in the faculties we possess, and assure us that the know-

ledge we acquire by the careful use of these is a real and substantial knowledge of the truth.

If now we examine the kind of knowledge respecting Light and Sound which recent discoveries have revealed to us, as compared with the knowledge which we had of them before these discoveries were made, we shall find that there is an important difference. The knowledge which we had before was the simple and elementary knowledge of Sensation. As compared with that knowledge the new knowledge we have acquired respecting Light and Sound is a knowledge of these things "in themselves." Such is the language in which we should naturally express our sense of that difference, and in so expressing it we should be expressing an important truth. The newer knowledge is a higher knowledge than the older and simpler knowledge which we had before. And why? Wherein does this higher quality of the new knowledge consist? Is it not in the very fact that the new knowledge is the perception of a higher kind of relation than that which we had perceived before? There is no difference between the two kinds of knowledge in respect to the mere abstract character of relativity. The old was as relative as the new; and the new is as relative as the old. Before the new discoveries, Sound was known to come from sonorous bodies, and

Light was known to come from luminous bodies. This was a relation—but a relation of the vaguest and most general kind. As compared with this vague relation, the new relation under which we know them is knowledge of a more definite and of a higher kind. Light and Sound we now know to be words or ideas representing not merely any one thing or any two things, but especially a relation of Adjustment between a number of things. In this Adjustment Light and Sound, as known to Sense, do "in themselves" consist. Sound becomes known to us as the attunement between certain aerial pulsations and the auditory apparatus. Light becomes known to us as a similar or analogous attunement between the ethereal pulsations and the optic apparatus. Sound in this sense is not the aerial waves "in themselves," but in their relation to the ear. Light is not the ethereal undulations "in themselves," but in their relation to the eye. It is only when these come into contact with a prearranged machinery that they become what we know and speak of as Light and Sound. This conception, therefore, is found to represent and express a pure relation; and it is a conception higher than the one we had before, not because it is either less or more relative, but because its relativity is to a higher faculty of the intellect or the understanding.

And, indeed, when we come to think of it, we see that all kinds of knowledge must take their place and rank according to this order of precedence. For as all knowledge consists in the establishment of relations between external facts and the various Faculties of the Mind, the highest knowledge must always be that in which such relations are established with those intellectual powers which are of the highest kind. Hence we have a strictly scientific basis of classification for arranging the three great subjects of all human inquiry—the What, the How, and the Why. These are steps in an ascending series. What things are—How they come to be—and what Purpose they serve in the whole system of Nature — these are the questions, each rising above the other, which correspond to the order and the rank of our own faculties in the value and importance of their work.

It is the result of this analysis to establish that, even if it were true that there could be anything in the Universe existing out of relation with other things around it, or if it were conceivable that there could be any knowledge of things as they so exist, it would be not higher knowledge, but infinitely lower knowledge than that which we actually possess. It could at the best be only knowledge of the "What," and that too in the lowest conceivable

form—knowledge of the barest, driest, nakedest existence, without value or significance of any kind. And further, it results from the same analysis that the relativity of human knowledge, instead of casting any doubt upon its authenticity, is the very characteristic which guarantees its reality and its truth. It results farther that the depth and completeness of that knowledge depends on the degree in which it brings the facts of Nature into relation with the Faculties which are highest in the scale of Mind.

Nor is this result surprising. It must be so if Man is part of the great System of things in which he lives. It must be so, especially if in being part of it, he is also the highest visible part of it—the product of its "laws" and (as regards his own little corner of the Universe) the consummation of its history.

Neither can there be any doubt as to what are the supreme Faculties of the human Mind. They are the Faculties which are concerned with Purpose—purpose in other minds, and purpose in our own. All others are the instruments and subordinates of these. The power of initiating changes in the Order of Nature, and of shaping them by the highest motives to the noblest ends—this, in general terms, may be said to include or to involve them all. They are based upon the ultimate

and irresolvable power of Will, with that measure of freedom which belongs to it; upon the faculty of understanding the use of means to ends, and upon the Moral Sense which recognises the law of Righteousness, and the ultimate Authority on which it rests. If the Universe or any part of it is ever to be really understood by us—if anything in the nature of an explanation is ever to be reached concerning the System of things in which we live, these are the perceptive powers to which the information must be given—these are the faculties to which the explanation must be addressed. When we desire to know the nature of things "in themselves," we desire to know the highest of their relations which are conceivable to us: we desire, in the words of Bishop Butler, to know "the Author, the cause, and the end of them." *

* Sermon "On the Ignorance of Man."

CHAPTER V.

On the Truthfulness of Human Knowledge.

BUT another nightmare meets us here—another suggestion of hopeless doubt respecting the very possibility of knowledge touching questions such as these. Nay, it is the suggestion of a doubt even more discouraging—for it is a suggestion that these questions may probably be in themselves absurd—assuming the existence of relations among things which do not exist at all—relations indeed of which we have some experience in ourselves, but which have no counterpart in the System of Nature. The suggestion, in short, is not merely that the answer to these questions is inaccessible, but that there is no answer at all. The objection is a fundamental one, and is summed up in the epithet applied to all such inquiries—that they are "Anthropomorphic." They assume Authorship in a personal sense, which is a purely human

idea—they assume causation, which is another human idea—and they assume the use of means for the attainment of ends, which also is purely human. It is considered by some persons as a thing in itself absurd that we should thus shape our conceptions of the ruling Power in Nature, or of a Divine Being, upon the conscious knowledge we have of our own nature and attributes. Anthropomorphism is the phrase employed to condemn this method of conception—an opprobrious epithet, as it were, which is attached to every endeavour to bring the higher attributes of the human Mind into any recognisable relation with the supreme agencies in Nature.

And here it is not unimportant to observe that the word is in itself a misrepresentation of the fundamental idea which it is employed to designate, and against which it is intended to raise a prejudice. Anthropomorphism means literally Man-Formism, conveying the idea that it is, in some sense or other, the human "Form" that is ascribed to the agencies which are at work in Nature.* But this suggestion is altogether at variance with the truth.

* It has been pointed out to me by my distinguished friend and old tutor, Dr. Howson, the Dean of Chester, that the Greek word μορφὴ ("Form") had a very wide range of meaning, and that (for example) in the New Testament it is applied to "the form of knowledge and of the truth" (Rom. ii. 20), and to the "form of godliness" (2 Tim. iii. 5), and

It is not the Form of Man that is in question. It is the Mind and Spirit of Man—his Reason, his Intelligence, and his Will. Nor is it even these under all the conditions, or under any of the limitations, with which they are associated in us. But the question is of a real and fundamental analogy, despite all differences of form or of limiting conditions, between the Mind which is in us and the Mind which is in Nature. The true etymological expression for this idea, if we are to have any word constructed on the same model out of Greek, would be, not Anthropomorphism, but Anthropopsychism, which means not Man-Formism, but Man-Soulism. The use of the word in this construction would raise much more truly the real issue. I shall therefore adopt it as a substitute in the argument which follows.

The central idea of those who object to Anthropopsychism seems to be that there is nothing human in Nature, whether as regards its materials, or as regards any agency which controls them, and that when we think we see any such agency

to spiritual things in other passages. But although this is true, the word "Anthropomorphism" seems to have been introduced in connection with the Greek habit of representing the Divine Personages of their mythology in the physical form of Humanity; and it now always conveys a certain flavour of disparagement from its association with this materialistic habit and conception.

there, we are like some foolish Beast wondering at its own shadow. The proposition which is really involved when stated nakedly is this: that there is no Mind in Nature having any relation with, or similitude to, our own, and that all our fancied recognitions of intellectual operations like those of Man in the Order of the Universe are delusive imaginations. If this proposition could be maintained, much indeed would follow from it. All confidence would be lost, not in one department only, but in every department of human thought and of human knowledge. That knowledge would come to us tainted at its very source.

At first sight it might appear as if all reasoning on the truthfulness of human knowledge must be reasoning in a circle. And so it would be if Reason were set to the task of proving the trustworthiness of itself. But the trustworthiness of our knowledge does not depend alone on the trustworthiness of our Reason. Our knowledge has other elements in it than the work of Reason. The operations of the Logical Faculty may have our absolute confidence, and yet the results arrived at may be full of doubt. The possibility of this doubt arises not from any distrust of Reason, but from a distrust of the data which are supplied to Reason, and on which it is compelled to perform its appropriate work. That work may be performed with perfect accuracy, and it

may be even inconceivable that it should be otherwise, and yet the conclusions to which such reasoning leads may be entirely false. This possibility arises from the possibility of Reason starting with assumptions which are erroneous. The machinery of a loom may be in perfect order, and all its movements may be in accurate adjustment; but if the thread supplied to it is bad, the web will be as unsound as its material. And so it is with the tissue of our knowledge. It is indeed useless to argue that Reason may be trusted. The very argument assumes the trust. But it is by no means useless to argue on the nature and on the sources of the data with which our reasoning is supplied. Now this is the very region in which the doubt of Anthropopsychism prevails, and in which Reason is habitually used to prove that all the data of knowledge are inaccessible. If this be an argument which is capable of defence, it must also be an argument which is open to reply. It is an argument which assumes that Reason can do something in testing the stuff on which it works. And so indeed it can. There is no substance in the material world the strength and texture of which can be tried by methods so sure and so various as the methods by which we can test the conceptions and intimations given to us from our contact with external Nature. The senses of the body, fine and

various as they are, do not compare in number or in fineness with the multiform apparatus, and the corresponding multiform operations, by which the Mind can try and verify the impressions of its own Intelligence. It is wonderful from how many independent points of view we can stand, as it were, outside ourselves, and mark those infinite and subtle coincidences between Thought and Fact which establish the Unity existing between all our Faculties and the great System which it is their business to understand and to interpret. Let us ascend to some of these points of observation now, and let us look around us as we can.

The argument which the word Anthropopsychism involves, if it be an argument,—or the suggestion of doubt, if it be nothing more,—is only another form of the doctrine or of the misgiving with which we have been dealing in the last chapter. It assumes that the relation between the human Mind and the System of Nature in which we live is fundamentally a relation of contrast and not of harmony—a relation of difference so deep and so complete, that the intellectual impressions which Nature gives to us are not presumably right, but, on the contrary, are presumably wrong. The analogies which we see, or think we see, between our own thoughts and the processes or the results of Nature are not real, but false analogies. There are no such things as

aims in Nature, and no such things as the employment of means for the attainment of them. The appearance of any such connection is an appearance only. It is a mere human aspect, and therefore a deceptive aspect, of the relation which really exists in Nature between the things which we see as causes and the things which follow as effects. The deceptiveness of this aspect arises out of the very fact that it is human, because what is human is at least non-natural, even if it be not positively unnatural and necessarily false. Man is no part of Nature. His Mind does not reflect her laws. On the contrary, his Intellect is separated by such a gulf from those laws, that it tends of necessity to misinterpret and misconceive them. The very forms in which our perceptions and our conceptions are moulded are forms which have no counterpart outside the Organism through which we see and think.

All this is the same general idea and the same line of argument with which we have been dealing throughout the whole of this Work, and which the facts we have examined have shown to be in every way at variance with the most certain truths. But every form in which this idea can be presented deserves the most patient investigation, both because of the power of the error it involves, and especially because of the subtlety of the suggestions from which it springs. The subtlety of these suggestions

lies in the close intermixture of what is true with what is false. From the beginning of this Essay I have protested against all conceptions of the Unity of Nature which depend on confounding her distinctions, or on concealing them, or in any way failing to give them their fullest value. I have dwelt, also, both here and elsewhere, on the respect we ought to pay in this matter to the evidence afforded by the ordinary use of Language—that great mine and record of intellectual impressions, in which men, very often unconsciously, keep alive the sense and the memory of distinctions which philosophers forget, or which sometimes they intentionally conceal. Now in the profound questions which are before us here, this unconscious evidence of Language has a good deal to say. It cannot be denied that in common speech we do habitually recognise a distinction between Man and Nature. Upon that distinction, whatever it may be, there are some schools of thought which place the highest value. They say—and they say with truth—that we must keep up our perception of real distinctions, if we desire to keep any secure foundation for our perception of true analogies. If we are to recognise anywhere with certainty the phenomena of Mind and Will, we must hold firmly to the distinctions which separate them from the phenomena of mere Physical Causation, and of Mechanical Necessity.

Agreeing altogether in this great fundamental principle of all knowledge, I admit the value of the instinctive perception which is reflected in common speech touching the differences between Man and Nature. But in order to estimate what that value really is, we must observe carefully the whole, and not a part only, of the evidence which common speech affords. We shall then find that in that speech there is an universal recognition of certain aspects of the relation between Man and Nature, in which the distinction between them dissolves and disappears. And these aspects are not rare or abstract, but familiar and continually present. We none of us, for example, ever think or speak of our own bodies as belonging to any other domain than the domain of Nature. Not only in their materials, but in the combination of them—in all the phenomena of birth, and growth—of disease, decay, and death—our bodies are part of Nature and are obedient to her most ordinary laws. The distinction, therefore, between Man and Nature is confessedly a distinction which must cut Man himself in two. It must separate his body from its functions—his hands from the work which they perform—his brain from the reasoning powers of which it is the Organ and the seat.

Beyond all doubt there is a distinction here, and a profound one, too. But it is no other than the old familiar distinction between Mind and Matter;

and the line which divides Mind from Matter is certainly not coincident with the line which divides Man from Nature. For just as the dividing line between Mind and Matter is a line which cuts Man himself into two parts, so also is it a line which cuts into two parts not Man only, but the whole Natural System of things in which he lives. For that System which we call Nature does not consist only in its body of raw materials and of elementary forces. It consists even more essentially in the arrangement and organisation of these for ends which are intelligible as such. The phenomena of Mind are not confined to Man. They are manifested, in the first place, visibly and directly, although in varying degrees, throughout the whole series of living animals. They are manifested, in the second place, as obviously, though less directly, in the innumerable adaptations of which these animals are the most conspicuous examples. The recognition of both these facts in common speech is instinctive, universal, and conclusive. We speak, of course, habitually of the aims of the lower animals, and of their contrivances to attain them; we speak not less habitually of the far more subtle and elaborate contrivances by which in virtue of their Organisation they are themselves enabled first to have these aims, and then to reach them. When, therefore, all these interpretations of Nature, equally common and instinctive, are set aside on the plea that there is not

merely a distinction, but an antagonism and a contrast between the Mind of Man and the governing agencies in Nature, it becomes necessary, in the conduct of this argument, to examine wherein the distinction between Man and Nature really lies; and in no way can this examination be conducted so well as by taking some typical illustrations of the circumstances under which that distinction comes out most broadly, and in which it may have struck us forcibly. I will take some illustrations which require a few words of preface.

Very often when we speak of Nature we are thinking of nothing but the Physical Forces, and of these, too, not in their combinations, but taken separately, and, as it were, by themselves. Now it is quite true that each one of the Physical Forces in Nature, taken by itself, works uniformly and (as it seems to us) of necessity. Under exactly the same circumstances and combinations, they all do exactly the same things. But, on the other hand, it is equally true that in Nature these circumstances and combinations are not uniform nor constant, nor are they of necessity. On the contrary they are conspicuously various and contingent. We can ourselves change them in a variety of ways which is almost infinite, and it is by doing so, and in no other way whatever, that we can ever do anything at all. The look and the aspect of things done in this way is familiar to us. We call them artificial, because

we recognise them to be the work of artifice; and in this recognition we rest upon the distinction between these things and other things which seem to be the result of no artifice whatever, but of mere Physical Causation, without any arrangement of conditions, and without any correspondence between preparation and result. For very often the Physical Forces work, or appear to us to work, not under any special combination, but, as it were, alone and by themselves. That is to say, they exhibit their purely natural effects under no particular or evident guidance or co-ordination or control.

Even when these unguided operations are seen ultimately to fit into some great use in the economy of Nature, both the result and the causes of it appear to us to be purely accidental. For example, the distribution of clays, and sands, and gravels, over the surface of the Earth forms an obvious link in the chain of causes which have prepared soils, and fitted them for the support of vegetation, and for cultivation by the hand of Man. But this distribution of various materials over the surface of the Earth has been mainly the blind work of water, acting, as it always must act, under the universal force of gravitation. All gravels are the fragments of former rocks. Some of these fragments have been broken off by frosts, washed down by rains, carried into the beds of streams, and deposited at great distances

from their original source. Other fragments have been carried into the sea, and have been rolled on stormy beaches for unknown periods of time. Now every one of these fragments is a work of Nature; many of them reveal a wonderful history, and are the best evidence we have of great changes in the physical history of the Globe. They differ in almost every locality, with the nature of the rocks around them, and sometimes with the nature of rocks which are hundreds of miles away. For this reason, the composition of gravels is a subject of great interest to geologists, and those who have been accustomed to consider the questions upon which they bear soon acquire a habit of observing them which is almost unconscious.

So it was that many years ago, as I was walking in a garden in the neighbourhood of Edinburgh, my eye wandered over the materials which had been freshly scattered on the path. Suddenly, and very unexpectedly, it lighted on a fragment unlike the rest, and unlike them in a way which instantly carried its own explanation on its face. All the other fragments were works of Nature. This one fragment was certainly a work of human Art. It was a very small, but a very perfect arrowhead, made of yellow flint. What was it that made its artificial origin so obvious at a glance? The Physical Forces of Nature, it is true, had made it; but they had

made it under special direction and control. The Physical Forces of Nature, working by themselves, under no special direction or control, could never have made that arrowhead. No mere splitting by frost, no mere chipping by accidental collision with other fragments, still less any wearing by rivers or by the sea, could possibly have moulded that perfect symmetry of form, with its sharpened point, with its two lateral barbs, and with the little shank between them. But all this reasoning was an after-thought. In coming to my conclusion, I was not conscious of any reasoning. The recognition was instantaneous. It was the recognition in that fragment, alone of all the fragments round it, of two things which of all others are the most familiar to us. The first of these was the adaptation of material and of form to a known end, and the second of these was that particular mechanical method by which the particular animal Man makes the adaptations he intends.

But now let us separate these two elements in the contrast between the arrowhead and the other fragments of gravel which lay around it. It was not the mere adaptation of material or of form to a known end which stamped it at a glance as human. It was the particular method by which that adaptation was attained. The mere character of adaptation to a known end—however it may have come about—belongs quite as much to

many works of Nature as to the works of Man. In this particular case indeed the surrounding fragments had not this character, but in many other cases closely analogous they might well have had it. For it so happens that in certain gravels of the South of England there are fragments in abundance closely resembling arrowheads, and with the character of special adaptation quite as visibly stamped upon them. These are the fossil teeth of Sharks which swarmed in the seas which deposited the gravels of "The Crag." These teeth are like the arrowhead in being perfectly symmetrical and beautifully sharp and pointed. The special end, too, to which they are adapted is equally the infliction of a wound in the flesh of animals. Both are Implements and nothing else. Moreover, the principal difference between the two forms of Implement can only be explained by the difference between two Intentions. The men who made and who used arrowheads intended the arrow to remain fixed and rankling in the wound it made. The barbs are specially adapted to the fulfilment of this intention. But Nature gives no barbs to the teeth of carnivorous animals, for the very good reason that their method of killing is by a rapid repetition of bites. Any difficulty or impediment in the way of the withdrawal of the teeth from the wound first inflicted would therefore be a hindrance

and not a help. It would clearly, therefore, be an obstacle to the intention in this case that the teeth of carnivorous animals should be barbed.

We see, then, that in this case of a close general resemblance between a work of Nature and a work of human Art, both are equally examples of special adaptation, and that the only difference between them by which we recognise the one to be a work of Nature and the other to be a work of Man, is that the one is made by the processes of manufacture, and the other is produced by the processes of growth. In the one case, the purposes of Intention are attained by processes which work outside of the material which is to be shaped. In the other case, the purposes of a closely similar Intention are reached by processes which work as it were inside of those materials. In the one case, the shaping takes place by hand; in the other case, the shaping takes place by growth.

Now it is perfectly true that in a great part of the domain of Nature the Physical Forces, not only individually, but in their combinations, always appear to us to be worked from the inside; whilst it is equally true that Man can only work and use them from a position which is comparatively external. But in this relative position to the Physical Forces there is, at least, no distinction whatever between Man and other living creatures. No other living

creature, indeed, is capable of making an implement like an arrowhead, because no other is capable of forming a deliberate intention so full of knowledge and of foresight. But many of the lower animals do build up and put together natural materials for the attainment of special ends. The nests of birds and of many insects, and the combs of Bees, are among the most familiar examples. How, in ordinary speech, should we classify these? In the common use of language, should we or should we not recognise the distinction between such artificial constructions and the growths of Nature?

Again, I should answer this question by a practical illustration, similar to that which I have employed in the case of the arrowhead. After the lapse of many years I found myself again scanning the gravel at my feet, in a very different scene from a garden in the neighbourhood of Edinburgh. It was on the wild banks of the beautiful river which divides the Province of Quebec from the Province of New Brunswick in North America. Among the most striking features of the New World are its noble rivers. The physical geography of Europe cannot afford the same rush of waters as the immense "catch-basins" of the American Continent. Even the smaller streams of the Canadian Dominion partake of the

same character of sweep and of abundance. The Restigouche is one of these. It falls into the head of the Bay of Chaleur, after running in a deep glen through many miles of forest hills. These hills are generally very steep; and the soil is comparatively poor, so that there are few agricultural settlers, and their farms are often widely separated. During a fishing excursion on that river in the month of July 1879, I landed from a canoe not far from the junction of a large tributary, the Patapediac. All Canadian rivers bear more or less driftwood down their course, and on some of them, at points which favour the accumulation of it, there are sometimes thousands of tons heaped upon each other in impressive and picturesque confusion. At the point at which I landed there was nothing of the sort. On the contrary, the shore was remarkably clean, the natural gravel being smoothed and compacted by the annual passage of the ice in spring. But I soon came upon one little bit of driftwood lying among the stones, and something peculiar in its appearance at once attracted my attention. It was, like others of its kind, well worn, and both ends were well rounded. On lifting it, I saw in a moment that it had not been broken by wind from its parent tree. There were no straggling points,—no torn fibres,—no look of mere accident

about it. At both ends it had been definitely cut, although the cut surfaces had been subsequently more or less smoothed by rubbing against the stones. On the other hand, nothing in its appearance suggested the work of a woodman's axe. On a closer examination the mystery was solved at once. Two deep incisions, as if made by two powerful chisels working together and parallel to each other, revealed the fact that this bit of wood had been cut and prepared by that curious animal to which, more than to any other, has been given an instinct and a habit of constructive purpose which resembles those of Man. It flashed upon me in a moment that I was holding in my hand one of the bricks, as it were, used in the building of a Beaver's dam, or possibly one of the loaves which are stored for winter's food.

Was this or was it not a work of Nature? Certainly not—in at least one ordinary meaning of the word. It was because of the distinction between it and the mere work of the winds and of the waters and of the stones that I noticed it as peculiar. It was because of this distinction that I then thought of it, and now write of it, as a thing of higher interest than a mere bit of the tangled driftwood of the Restigouche. But if any one should hesitate upon this point, namely, as to whether things fashioned and shaped by the

lower animals do or do not come under the category of "works of Nature," then this very doubt or hesitation is itself significant. It shows that there are points of contact between the two categories so close that we can hardly say to which of them certain things belong. It shows that the distinction is one of degrees, and that there are departments, as it were, in Nature so much higher than others, that they seem to rise above the level of her physical domain.

And this aspect of the matter in question will grow upon us the more closely we regard it. For whatever doubt we may have as to the classification we should assign to the stick which the Beaver had prepared, we can have no doubt whatever as to the classification we should assign to the Implement by which the Beaver had prepared it. These two deep incisions by which it had been cut were the marks of the tools which had been employed. Those tools were the Beaver's teeth. But these teeth are, beyond all question, works of Nature. In themselves they are nothing more than specially adapted forms of the four front teeth, two in each jaw, which are common to the great group of animals constituting the Order "Rodentia" in the Mammalian Class. The Beaver has indeed another Implement also adapted to the special purpose of dam-building, which is altogether peculiar to itself,

and that is a flattened tail, which in its peculiar movements and powerful muscles is unlike the tail of any other rodent, or indeed of any other animal. The whole is an apparatus enabling the tail to be used with great force as a trowel for beating mud into the interstices of the timber, and for thus giving to the structure sufficient solidity and coherence to arrest and resist the flow of running water. This Implement of the tail is an unusually special adaptation to the end of dam-building, because it is more exceptional in its structure, being indeed absolutely unique in the organisation of the Mammalia. And so the finished dam, even more than the single stick used in its construction, shows us that there is a gradual passage from things which beyond all doubt we should call works of Nature to other things which as certainly we should recognise as works of Art.

And when this passage has been traced in the works of the lower animals, we recognise it as a passage which is not less obvious in the works of Man. The hand of a man we call a work of Nature, but the products of that hand we call works of Art. Yet it is needless to say that there is an indissoluble unity between the two. Just as the teeth and the tail and the whole physical structure and mental instincts of a Beaver are harmonious members of a series

leading up to engineering works of great strength and skill, so the hand of Man is the one great implement which is co-operant with a brain of indefinitely greater constructive ingenuity. In both cases the Organic Implements are classed as works of Nature. In both cases the works which they construct are classed as works of Art. And so the principle of the distinction which is unconsciously reflected in common speech is a principle which we can trace to its source. All living things are in themselves works of Nature, whilst all the works which they by their structure, and by their corresponding instincts, are enabled to execute are, in their measure and degree, works of Art.

There is, in this distinction, as there generally is in the distinctions of common speech, a profound philosophy. Between the adapted structure of all living creatures and those other adapted structures which these creatures have been fitted and formed to make, there is indeed no break of continuity, but there is the introduction of an intervening Personality, — of a living Will, however narrow its bounds,—of a derived and delegated power to do afresh, in small measures and degrees, that same kind of work which, in much larger measures and degrees, has been done for them in their own structure, and for their own existence

and enjoyment. These works of living creatures are thus, as it were, works of Nature done by commission and at second-hand. A great distinction this, no doubt,—and all the greater in proportion as the delegation is less restricted and the commission is wider in the powers conferred; but it is a distinction which is obviously subordinate, and lies wholly inside the larger definition which we must give to Nature when we consider how absolutely all the powers wielded by the Personality of all living creatures are delegated powers, given in and through adapted structures. Moreover, when we look at the infinite gradations under which Personality is constituted among living creatures, and how various are the degrees of freedom and of originating power which have been given to them, we must see that in this respect there is no distinction between the highest and the lowest. In this respect, I say—meaning by these words to specify the one characteristic of delegation, and not meaning to deny a vast difference in the gifts and powers which by virtue of that delegation are conveyed.

Here is the confusion which exists in many minds. They fear that if their powers of thought and of contrivance are referred to that Organisation which is undoubtedly the work of Nature, these powers must be degraded into mere functions of

organic or mechanical necessity. But the character of delegation does not in itself necessarily imply anything of the kind. Two men may be equally the agents of another, although the one is bound down by precise and imperative instructions, whilst the other is intrusted with a wide and a free discretion. And so it is with that great army of living creatures which are all equally the births of Nature, but which hold innumerable ranks and commissions in her service. The work of some of them is menial, almost mechanical, and more or less unconscious. The work of others partakes in an ascending order of degrees of a larger and a larger share of Intelligence and of Will. Man is separated from all others by a great gulf in the measure in which he partakes of these. Nor will it make any difference in the argument if the mental gifts of Man are regarded as so immeasurably superior as to be "different in kind." This is a question of definition; and although I know of no definition of Intelligence or of Will which does not include the lowest manifestations as well as the highest, yet it is unquestionably true that between the two ends of the scale there is a distance and a space which is, as it were, infinity. In Man new elements are added to those which are manifested in the lower animals, and these new elements make him almost as a God to them. But he cannot be

as a God to himself; for if he sees a gulf below him, he is only too painfully aware that there is a much wider gulf above him. We may separate as widely as we please between Man and the Beasts; but in the general fact that in all his great powers and in his wide extent of freedom he is the creature and the child of the Natural System in which he lives, there is no difference at all.

It results from this analysis that if Man is to be considered as separate from Nature because of the external relation in which, under certain aspects, he stands to the Physical Forces, and because of the necessity he is under in all his works of acting upon them "from the outside," then the whole vast series of the lower animals must be considered as also separate from Nature, because of their like position, and because of the same necessity under which they lie. They all partake of that individuality—of that separateness and of that voluntary power—in which Personality consists. Within some little area, however small, they are all free, and they all do whatever they may have to do by acting "from outside" on the materials and on the forces of the world around them. Moreover, it results from this analysis that as Man and all other living beings are separate from Nature in this one aspect of their relations to her, so they are all equally united to,

and form part of, Nature in that other aspect—far more intimate—which concerns their own physical Organisation. For that Organisation is a growth and not a manufacture. It is the work of the Physical Forces under the combinations which are effected by that particular agency which we know as Life. It is a further result of this analysis to show that in respect to the evidence of Intention there is an absolute unity—a perfect continuity—between the structure of every Organism and its works or doings. It can only make or do what the Apparatus given to it fits it and enables it to do. It is certain, therefore, that the same interpretation which applies to the work must apply to the Apparatus by which the work is done. If the human or anthropopsychic interpretation of the works and actions of all living Beings is the only interpretation which explains them, it must be the only interpretation which explains the adapted structures through which these works and actions are performed. The reasoning must be false which admits the evidence of Will and Purpose in the comparatively limited degree in which these attributes are exhibited in the actions of the lower animals, whilst it denies them in the much larger degree in which they are exhibited in the fashioning of the tools with which they are supplied. If the anthropopsychic explanation of a Beaver's dam

is the only explanation which would be tolerated by common sense, it is not less certainly the only explanation which can be satisfactory of the Beaver's teeth and of the Beaver's tail.

And if there be ever any difficulty in accepting this conclusion because of the apparent difference between the methods by which Man attains his ends and the methods by which like ends are attained in Nature, let us consider well in what that difference consists. Man—it is often said—works his Will in Nature, in so far as he can work it at all, by acting upon the chain of Physical Causation "from the outside." In Nature no one can be seen working in a like position. Everything seems to us to be done from inside that chain, by action which not only appears to be automatic, but to be self-originated and self-sustained. But can we not see how slippery are the foundations on which this distinction rests? We must feel and know how ignorant we are of the ultimate constitution of things, and especially of the ultimate relations of Mind and Matter. Moreover, we must feel and know that this is precisely the region of thought in which the anthropopsychic objection suggests itself. What accurate conception can we really form of that which is "outside" of the Physical Forces and that which is "inside" of them? Yet this is the main distinction which strikes us between a growth and a manufacture—between the adapted struc-

tures of which Nature is so full and those other adapted structures which are made by ourselves and by other living creatures.

Are we quite sure that this contrast of relative place between the agencies of Mind and the Forces of Matter is a real contrast in the nature of things, or a contrast which is apparent only? May not our notions of what is outside and of what is inside of Nature be liable to the same kind of error which used formerly to affect our notions of downwardness and upwardness of direction on our own Globe? No apparent distinction was once more fundamental in physics, and none interposed a greater obstacle in the way of accepting and understanding the real constitution of the Universe. How could there be an Antipodes where men and animals would hang with their heads downwards? But this difficulty was cleared up when men came to understand that there is no such distinction as "downwardness" and "upwardness" in absolute Space, and that although our perception of this distinction is not at all false or deceptive when it is properly understood, but, on the contrary, is perfectly true in its own limited sphere, it is the perception of a truth which is local, as it were, and relative, and does not stand in any contradiction whatever with the higher truths which affirmed that a habitable Antipodes was possible, because the same absolute direction which is

upwards on one side of the Globe would be downwards upon the other. It is perfectly true that downwardness is a fact of consciousness to us; but it depends upon the direction in which the force of gravitation is felt as exerting its greatest energy upon our bodies. In like manner the outwardness of our own mental relation to the Physical Forces over which we exercise some control is a fact of consciousness, and so likewise is our own impression as to the apparent inwardness of the agencies which work in Nature. But this contrast is one which may well be apparent only, and may be the mere result of the invisibility of the forces by which the motions of Matter are effected. The truth is, that when we come to think of it, we never do believe that the visible motions of Matter which appear to be spontaneous and self-determined, can be so in reality. We always conceive of these motions as due to some "force" acting outside the matter which is moved. Our idea of Causality always does, and always must, go behind and beyond the Visible; and so we can readily understand how it is that the Physical Forces must of necessity seem to us to be working "by themselves," when in reality they may be working under a strict control.

Two circumstances in our own experience may help us better to understand how all difficulty on this subject may easily arise from exclusive attention to partial aspects of the truth. One of these circumstances is this—that in our own bodily Organism the

two apparently contradictory aspects of the relationship of Mind to Matter are both present, and are both continually observed. The passage from movements which are wholly internal and automatic to other movements over which the Mind has usually an outward and complete control, is a passage of insensible gradations. The second of these circumstances is this, that the most ingenious of all human machines—those in which Mind is most present and most triumphant—are precisely those in which the Physical Forces have most the appearance of acting by their own internal energies, and by nothing else. Almost all the machines which are employed in the service of civilised life, even the most simple, when first seen by Savages, are supposed by them to be living creatures, because, in their own limited experience, they have no conception of mental purpose, intention, or contrivance reaching so far by means of mere external action upon the natural forces. It never occurs to them that it may be all done by acting upon those forces precisely as they themselves act upon them in the shaping of a spear or in the aiming of an arrow. They conclude, therefore, that the action of the machine is analogous to that other kind of action with which they are even more familiar, and which does much more complicated things, namely, the kind of action by which they move their own bodily Organs. This

kind of action is from a source which is inward, and constitutes the special power of a living Personality.

Now we can very well understand that in respect to our knowledge of and resource over Nature we are all comparatively in the position of children or of Savages, and our conclusions as to the limits of mental action upon Matter, or of the relative place in which Mind may take its stand in causing the subject movements of Material Force, we may very easily be liable to the same delusions. Limited as our knowledge and resources are, it is, nevertheless, wonderful what we ourselves can make the Physical Forces do in the way of representing, fulfilling, and embodying the purposes of Mind. It may sound strange, but it is nevertheless strictly true, that we can and do make machines with the power and the faculty of self-control. There is a well-known part of the steam-engine which is called the "governor." It is what its name implies. When the energy of the steam is excessive for its intended work, it is the function of the "governor" to restrain and limit the supply of that energy to every part of the machine, and amongst others to itself. With a sensitiveness as delicate as that of any living thing, and with an instantaneousness of action which exceeds that of the most resolute and wakeful Will, this function of watchfulness and restraint is perfectly discharged. To all outward appearance, and in a certain sense

in reality and in truth, this action has its origin inside the machine. A mode of action which is essentially variable and contingent is yet due to rigid Physical Causation, and has all the appearance of being part of the chain of cause and effect which men speak of as fixed and unalterable. This variable action arises as a necessary consequence out of those invariable laws of motion, to which "centrifugal force" is due. And yet all this appearance of inwardness and of spontaneousness in the action of the governor of a steam-engine is—not false indeed, but—a partial and imperfect aspect of the truth. In reality it is the work of Mind. In reality its source lies outside the chain of Physical Causation,—in that power which stands behind it and above it, and which uses the rigidity and uniformity of the Physical Forces as the instrument of its own varying intentions.

This is an example which enables us to understand how widely, and indeed how universally, and yet how secretly and invisibly, the same principle may prevail in the System of Nature. In all its mechanism those actions which appear to us to be automatic may well be so only in the same sense. They work "of themselves;" but then they can work as they do only because those "selves" are adjusted to do certain things. There are many automatic movements in our own bodies which are

a perfect illustration of this principle—such, for example, as the Apparatus which watches against the introduction of food into the wrong passage of the throat, and shuts it off, or coughs it out, by sensitive and convulsive actions which are entirely beyond the control of the Will. All these automatic movements and all the Apparatus by which they are effected are the work of Nature, as distinguished from the work of Man; and yet they all may be equally effected by some action originating outside the chain of mere Physical Causation. The immediate adequacy of that causation to produce mechanically the observed effects has nothing to do with the question. In both the instances which I have just cited that adequacy can be perfectly traced and explained. In the one case—that of the governor in a steam-engine, the flying apart of two whirling balls is made by connecting rods to lift a valve, and the more violently the balls are whirled by any excess of steam, the more they fly asunder, and consequently the more they lift the rods and close the valve. In the other case, that of the Apparatus for protecting the windpipe, a nerve of extreme sensitiveness and irritability is spread over a particular muscular surface, and the contact or passage of any foreign body at once produces automatically a violent and convulsive contraction. In like manner and in close proximity there is another

similar Apparatus with an exactly opposite purpose —an Apparatus which, instead of rejecting foreign matter, is, on the contrary, made to seize it and force it down the passage which it ought to take. But all these chains of Physical Causation are made into "chains" by links which are joined, not by necessity or by accident, but by Adjustment for the discharge of a particular function. In neither case is the Physical Causation intelligible without reference to the special end to which it is directed.

And here we come upon a doctrine or abstract proposition which, like the elementary propositions of Euclid, bears upon the face of it all the characters of an axiomatic truth. Strange to say, it is often quoted now as a stronghold of Materialistic philosophy, and as establishing the all-sufficiency of purely mechanical explanations. That doctrine is this—that the foundation of all science is confidence in the Intelligibility of Nature.* And never was there any axiom with a richer meaning,—never any with wider or more searching developments of truth. It is an axiom which asserts that the system of Nature is in close correspondence with the Intelligence of Man. But this correspondence must be with the whole of Man's Intelligence, and not with a bit of it only. Those who try to restrict it to a part of our Intelligence, and that part certainly not

* Lange's "Hist. of Materialism." Transla. vol. iii. p. 20.

the highest part, are not reasoning in consistency with the axiom, but in defiance of it. They are taking its name in vain. The doctrine of the Intelligibility of Nature demands that this Intelligibility should be coextensive with the whole range of Man's Intelligence, and must embrace especially the higher faculties as well as the lower. Those which perceive the reason of things must be included as well as those which perceive their causes merely. This is the scientific basis on which we can affirm with certainty that the anthropopsychic view of phenomena, when duly understood and limited, is at least one most just and necessary aspect of the truth. If the Intelligibility of Nature demands that we should trust our mechanical faculties when they recognise the relation between completed structure and actual performance, it demands not less clearly that we should trust those other intellectual faculties which recognise the relation between the preparation of that structure, and some foresight of its work. In the System of Nature there is no break of continuity between these two. There is a perfect passage and a perfect unity.

The assertion is often made, but is quite unfounded, that the explanations which consist in the perception of Purpose are obliged to fly to the dark places of Nature, where mechanical explanations have not yet been, or may never be discovered. The con-

trary is the truth. Nowhere does the light of Purpose shine more clearly to our Intelligence than in those adaptations of Nature in which her machinery and her means have been most perfectly explored. In some cases it is the extreme simplicity, in other cases it is the extreme complexity, of the means employed which most strikes us with wonder and admiration. But in no case does our perception of mechanical causes obliterate or supersede our perception of the aims to which these causes have been made subordinate. These two perceptions are not antagonistic, but complementary. Neither is complete without the other. But of the two, our perception of aims is perhaps the best able to stand alone. The most perfect ascertainment of mechanical cause, the clearest explanations of animal structure and of Apparatus which are attainable by us, must necessarily be incomplete, even in the purely mechanical point of view, because they leave untouched the mystery attaching to the special combinations of elementary substances and of elementary forces out of which all such structures are built, and by means of which all their appropriate mechanical effects are reached. But when our Intelligence has once recognised in any natural action the discharge of a particular function and the adaptation of means to a definite end, it is able to repose upon that perception as affording full and adequate satisfac-

tion to some at least of the highest of our mental faculties. It is true, indeed, that this perception does not attain the rank of an ultimate truth, for the simple reason that, high as the faculties are which recognise the reason of a thing, there are other faculties higher still, which seek to know where that Reason—that Logos—is seated, and what is the place of its habitation. This, however, is a question belonging to another category. It passes into the region of Theology. But the impossibility of answering it by the methods of mere physical research does not imply the smallest doubt in the truthfulness of those perceptions which in the course of that research see and recognise the Reasonableness of Nature. The doctrine of the Intelligibility of Nature does indeed guarantee the correspondence of our faculties with her operations so far as those faculties carry us. But it does not affirm that our Intelligence is co-extensive with the whole domain of knowledge. We may be absolutely sure that we are right when our Reason recognises another Reason in the machinery of Nature, although we may be wholly unable to discover more than a few of the conditions under which that Reason works.

It is here that the deceptions of a really false and spurious Anthropomorphism — properly so called—begin to work. Mind in ourselves is in-

separately connected with organised Matter, and especially with a Brain. Of the nature of this connection we really know nothing. All the attempts to explain it, or even to express it, are empty words. But the inference or conclusion that Mind cannot exist, or cannot be recognised, except when seated in a Brain, is evidently the rudest and coarsest conception in which Anthropomorphism could possibly be embodied.* It is erecting the Form of Man into a necessity of thought. It is assuming that Form to be the only form through which thought can be exerted, or in which Mind can exist. Even if we could see no obvious absurdity in such an idea, it would still be unsupported by any reasonable argument. But we can see very clearly at least one consideration which suggests that this idea not only may possibly be absurd, but is probably absurd, from facts and considerations which are perfectly accessible to our Intelligence. One of these facts is this—that the Brain itself has all the characters of a machine constructed for a purpose. Its elaborate mechanism—unexhausted and apparently unexhaustible to us in the subtlety and complexity of its structure,—with its ramifications of nervine tissues permeating every portion of the body, and constituting the very

* "Science knows only one kind of Mind, that is, human."—Lange: "History of Materialism," vol. iii. p. 73.

essence of every special Organ,—some of them being the channels of all receptive, and others the channels of all reactive powers,—this wonderful mechanism is visibly to our Intelligence an Organ—an Apparatus. Now we can perfectly understand the possibility of machines which are in a sense self-acting, and, within certain limits, self-regulating. But we cannot conceive any machine which, in the fullest sense of the word, is self-made and self-originated. The Intelligibility of Nature negatives this idea as nonsense and self-contradiction. It demands, therefore, that an Apparatus should be regarded as a result of preparation, and it demands farther that the agency which prepares cannot be the same as the product which is prepared. The Brain, therefore, instead of appearing to our Intelligence as the only conceivable seat and shrine of Mind, is recognised by Reason as an Apparatus prepared by Mind for the play and exhibition of some little loan or emanation from itself, with a definite and prescribed sphere of Perception and of Thought. It is, as it were, a little pool drawn from an illimitable Ocean, and so set round and girdled by containing walls as to reflect only its own little prospect of the world, and its own little patch of sky. Here, as elsewhere,—here in this most secret arcanum of Nature,—we perceive that same outsidedness of Mind in its relation to Matter of

which we seem to be conscious in the operations of our own Intelligence when it works out its own resolves and makes the elements and the Forces of Nature subject to them.

It appears, then, that, on close examination, the one great distinction which is sometimes supposed to separate fundamentally between the mechanisms of Nature and the mechanisms of Man—namely, that Man acts from "outside the chain of cause and effect," whilst Nature works from "inside" that chain—is a distinction which vanishes away. The Apparatuses of Nature do not even seem to us to be self-constructed, and our instinctive sense of the Intelligibility of Nature renders it impossible that we should so regard them. The constructive Agency, wherever its ultimate seat may be, is certainly and almost visibly outside the materials with which it works. The only difference is this—that whereas we are ourselves conscious of standing outside the chain of mere Physical Causation in a very limited sense and in a very limited degree, the constructive Agency in Nature seems to stand outside and above it in a measure and degree which is unattainable to us.

And here it is most significant to observe, that the progress of physical research, instead of tending to obliterate or to narrow, is tending, on the contrary, to broaden and deepen the distinction between

the bare Elements of Matter or the Physical Forces of Nature and the complicated structures which have been erected out of them. In all departments of science the power and dominance of abstract conceptions in the interpretations of Nature has become so much more and more conspicuous that it is daily found more and more profitable to explain, and more and more possible to predict, the most elaborate series of phenomena by the processes of arithmetical calculation, and of mathematical analysis. And where mathematical explanations fail, there other mental conceptions of a still higher order step in, and are ever carrying us to loftier and loftier summits in the Intelligibility of Nature. Above all others, perhaps, the science of Chemistry has made discoveries—corroborated more and more by investigations purely physical—which have cast an entirely new light on the ultimate constitution of material things. Let us look for a little on what this light is and in what its novelty consists.

CHAPTER VI.

On the Elementary Constitution of Matter in Relation to the Inorganic.

THE Materialistic Philosophers of the ancient world had reached by purely speculative thought some conceptions as to the constitution of Matter which have a curious likeness to the conceptions of modern science. It would be wrong to say that this likeness is superficial. The correspondence between ideas reached in early ages by abstract reasoning or by intuitive perception, and ideas reached in modern times as the result of physical research, is one of the most instructive incidents in the history of human thought. It is a correspondence pointing unmistakably to the close consanguinity of the Mind of Man with the whole System of external Nature, and to the consequent fidelity of its general impressions when it looks into that System with scarcely any other apparatus than its own thoughtful and inquiring gaze. It is thus that

the early Greek philosophers had conceived the idea of Atoms as the ultimate particles of Matter, and they were full of curious imaginations as to the important, and indeed the fundamental part which they played in the constitution of the Universe. We know that a similar idea, or at least an idea which finds its best expression in the same word, lies at the very root of the conceptions which have been reached by modern science. But modern science has discovered the inseparable connection between this idea of Atoms and other physical conceptions of which the Ancients knew nothing. They had an idea indeed of Matter consisting of ultimate particles, and they had an idea, too, that these particles were not so much indivisible as practically undivided. Their acute and subtle intellects could not fail to see that an Atom, in the strictest sense of the word, is inconceivable. Everything which has any extension, however small, must be conceived as divisible. They saw, therefore, that the ultimate Atoms of which Matter consists can only be ultimate, not because they can be absolutely indivisible, but because as a fact they never are divided.

There is a wonderful and instructive coincidence here between ideas based upon the research of outward things, and the older ideas based upon the search of the human Spirit into its own conceptions.

But the search into outward things has carried us farther now—into new and more wonderful regions of speculation and of thought. In the idea of an Atom—divisible indeed, but never divided—breakable, but never broken—the Ancients had got hold of an idea which gave them the unit of mechanical aggregation. It gave them, as it were, the bricks or the prepared stones out of which the edifices of Nature have been reared. But it gave them nothing more. It gave them no conception of the building process. It gave them no conception how the bricks and stones could be put together—some to serve the purpose of foundations, others to serve the purpose of walls and of chambers,—and of passages of communication,—and of batteries of force, —and of centres of energy,—whilst others again are made to range themselves in ever-varying lines of ornament and of beauty.

I do not say that modern science has explained this fully. Very far from it. But it has explained it in a measure and degree by the discovery of agencies, of forces, and of energies determining the movements of Atoms, of which the ancient philosophers had not even the most distant dream. They knew —indeed they could not help knowing—something of the idea of Force as it is exerted in the human body, and also as it is exerted among dead things in the phenomena of Weight. But these were the only

forces, the only sources of energy, of which they had any notion; and even as regards the phenomena of Weight, they had no idea of the mystery which attaches to the Force which we now know as the Force of Gravitation. Perhaps even in the present day we do not sufficiently estimate that mystery. The sense of Weight in ourselves, and the universality of its effects on the things around us, make it so familiar that we are apt to regard it as a thing of course, and as needing no explanation whatever. And yet the physical causes of Gravitation are absolutely unknown. Why and how it is that the particles of Matter are drawn or impelled towards each other in direct proportion to each other's mass, and in a definite inverse proportion to the distance from each other, is quite inexplicable in the present state of our knowledge. Attraction is almost certainly not what it appears to us to be. "Action at a distance" is not really conceivable; so that when two distant bodies seem to exert any influence on each other, the effect must be really due to some intervening medium by which they are pushed or pulled. But assuming the mutual attraction of all the particles of Matter as the provisional expression of an ultimate fact, it goes but a very little way indeed towards explaining the constitution of Nature as we see it. The ancient Materialists made as much of it as they

could. They conceived the existing Order of Nature to have been evolved out of the mere clash of Atoms. And no doubt the mutual attraction of the particles of Matter under the Force of Gravitation may account for the condensation—that is to say, for the mere aggregation of them. It may indeed account for a great deal more, because it is possible that all the energies of Heat and Light may be due to Gravitation. Various hypotheses involving this idea have appeared from time to time; and nearly thirty years ago Sir W. Thomson lent the high authority of his name to a theory in which Gravitation was made to account for all the Light, Heat, and Motions of the Universe. But this is a conception far beyond the knowledge of the Ancients. They simply generalised from the ordinary phenomena of Force and Weight. The idea of motion is of course involved and presupposed, and the further idea of eccentric clashing among the Atoms leads to the conception of movements in circles, in ellipses, or in vortices.

These conceptions supply almost the whole furniture of the old Materialism; and it is a curious fact that there is a distinct tendency in modern Materialism to lower and impoverish the language of science down to the level of that pre-scientific age. Even those who have no tendency to theoretical Materialism are very apt to adopt language

which reproduces nothing but the crude conceptions of the Lucretian philosophy. Thus it has become almost a cant expression amongst writers on physics and on physiology to ascribe every property exhibited in Matter, whether that Matter be dead or whether it be connected with vitality, to what they call its "molecular constitution." Now the word "Molecule" has been appropriated by general agreement among chemists and physicists to those particles of Matter which are the units of cohesion or of mechanical aggregation, as distinguished from the Atom which is the unit of chemical combination. The Molecule is a group of Atoms so united that no mechanical force can shake them loose. All the mechanical forces, therefore, find the Molecule to be an indivisible Unit, and can only deal with it as such. Chemical Force alone can get at the Atom. No other force can sunder the combinations into which it enters. A compound substance may undergo the most violent changes—it may be ground to dust, it may be melted into liquid, it may be dissipated into gas, and yet its molecular group of Atoms will remain intact. The Molecule of a compound substance, however changed in form, is still the same compound of the same elementary Atoms which constituted the substance before its change. Thus the Molecule of water, when driven by heat into the form of steam, is as much a chemical compound of

oxygen and hydrogen as it was when it cohered with other molecules more closely in the liquid form, or less closely in the solid form of ice. On the other hand, the Molecule of an elementary substance and the unit of its mechanical aggregation, may be either a little group of its own Atoms, or it may be these Atoms single and alone. It will be seen, then, that the phrase "molecular constitution" is a phrase which essentially expresses, and always suggests, the idea of mere cohesion, or of mere mechanical aggregation, and of nothing else.

When, therefore, the profoundest distinctions which exist in Nature, as. for instance, the distinction between a Germ that is to develop into a Reptile or a Bird, and the Germ which is to develop into a Man—when this distinction is spoken of as depending on the "molecular constitution" of the two Germs, the phrase either means nothing, and becomes a mere formula for concealing ignorance, or else it is a phrase which means that the most diverse issues of Organisation and of Life depend on nothing else than differences of mechanical arrangement in the ultimate particles of Matter. Now although science is helpless to explain all that we desire to know in these deep questions, it has taught us quite enough to enable us to see that the explanation suggested in this kind of language is certainly untrue. We can see, and we can be absolutely sure, that not

only the mere aggregation, but even the orderly arrangement of the ultimate particles of Matter, is not the cause, but the consequence and effect, of the energies which work in chemical and in vital phenomena. It is not only a rude and coarse conception, but we are now entitled to say that it is an ignorant conception of the System of material things, that it consists essentially in mere aggregation or in movements arising out of the accidents of mechanical collision. It was not a very rational conception even in the ages when the human mind had little to go upon beyond the vague impressions it derived from a very few obvious facts. But in these days, when a whole world of new and wonderful discoveries has been opened to our view in respect to the nature and properties of material Atoms, it is not too much to say that any return to this conception now is a return to the beggarly elements of an exploded superstition.

The Atom of modern chemical science is a very different thing from the Atom of ancient speculation. Both in itself and in the powers with which it is invested in its relation to other things, the Atom of science is a new conception. In itself it is no longer an ultimate particle merely because there is no agency capable of dividing it. Its relation to Matter is no longer like that of a grain of sand, or of a mote of dust, to the rock or to the stuff from which it has

been derived. All these are as it were accidental products, having neither form, nor size, nor weight which is constant or invariable. But it is the cardinal idea of the new conception that the Atom of each elementary substance is, as it were, and as Sir J. Herschel has called it, a "manufactured article,"—that is to say, that it has properties which are not necessary, but contingent and artificial. In particular it is absolutely uniform in size and weight. This absolute identity and uniformity obtains in every elementary Atom, not only in this world but in all the most distant worlds of space. The Atom of hydrogen, for example, seems to have absolutely the same properties whether it is seen in the light of the great stars Sirius and Arcturus or in the decomposition of water on our own Globe. In both places the molecule of hydrogen executes its vibrations in precisely the same time. That the sciences of Physics and of Chemistry confirm each other in asserting the absolute unity and uniformity of the Atom. We have no knowledge of any natural process by which such absolute Units of Mass with identity of properties can be produced. Professor Clerk Maxwell, speaking of these facts, and following up the opinion embodied in the dictum of Sir John Herschel, has declared that "each molecule throughout the Universe bears impressed upon it the stamp of a Metric System as distinctly as does the metre of

the Archives at Paris or the double royal cubit of the Temple at Carnac."

But great as the difference is in this respect between the Atom of the ancients and the Atom of science, there are other differences which are even greater and more significant. These greater differences affect not merely what the Atom is, but what the Atom does. It is not merely in its physical constitution and definition, but in its powers and functions, that a new world has been opened up in the doctrines of Materialism by the idea of the Atom as scientifically conceived. It is no longer a mere particle dashing about at random under the impulse of projectile or gravitating force. In some respects indeed it has lost certain ideal and mysterious properties which the ancient Materialists imagined as belonging to it. It is no longer regarded as infinitely small, or as infinitely hard and strong, or as absolutely impenetrable, or as so absolutely single as to be in itself destitute of parts. On the contrary, it is now conceived as "already quite a complex little world," as a "piece of matter of measurable dimensions, with shape, motion, and laws of action which are intelligible subjects of scientific investigation." The Atoms of some particular substances in the gaseous state have been approximately counted, approximately weighed and measured; whilst the average velocity of their movements in a certain

length of path has been made the subject of mathematical calculation.

So far it may be thought that the old Atom has been disenchanted of its mystery, and has been brought down into the terms of purely mechanical conception. But this is only one-half of the truth—one aspect only of the discoveries of modern science in respect to the nature and functions of the Atom. Whatever of mystery has been subtracted on that side has been far more than added on another. The dynamic aspect now underlies the mechanical aspect, and forms, as it were, an investing medium, which not only surrounds but permeates the Atom and all its works. In the light of Chemistry the Atom comes out as the centre and the focus of energies and powers the most complicated and the most subtle that exist in Nature—so complicated and so subtle indeed, that the utmost resources of chemical and physical research are unable as yet to give of them anything like a complete or even an intelligible account. In the first place, the Atom is not one thing, but many things. Each of the elementary substances has its own separate Atom, with its own separate size, its own separate weight, and its own separate properties. In the second place, these properties are not absolute, but strictly relative to the corresponding properties of the Atoms of other substances which may be contiguous. Thus the

Atom of oxygen is totally different from the Atom of carbon, and the nature of the difference consists, in so far as we can understand it at all, not only in differences of size and weight, but even more essentially in different dynamic relations of attraction which these elements bear to each other, and to the Atoms of other substances.

Moreover, these relations of chemical attraction are curiously governed or limited by numerical laws, which have tasked the ingenuity of chemists to express in language. The power of one Atom to attract to itself and to combine with a definite number of other Atoms, and no more, is called its "Valency;" and according to the number which is the limit of its power it is called bi-valent, or tri-valent, or tetra-valent. Further, these relations between one elementary Atom and another have nothing to do with, or are at least wholly different from, the relation of gravitation. In Chemical Force Atoms do indeed attract each other, but not in a manner or degree which has any reference to each other's mass. The Atom of oxygen, for example, when in contact with the Atom of one substance, such as nitrogen, may be absolutely passive and inert, whilst in the presence of the Atom of another substance, such as hydrogen or carbon, it will manifest the most intense activity. Then, again, the nature of that activity, and of the activity of all

other Atoms under the action of Chemical Force is peculiar. It cannot exert itself at all across any measurable distance. Chemical combination requires the closest contiguity, if not actual contact, and very often this contiguity or contact can only be brought about under conditions of heat or of solution, which must be carefully prepared. But when this contiguity has been brought about, then chemical combination is the activity of violent attraction, resulting in a kind of union or combination the most intimate and the most absolute which is known or can be conceived. Indeed, so close and so intimate are the unions effected by Chemical Force, that it is really not possible in the present state of our knowledge to conceive the ultimate nature of them.*

* Sir B. Brodie, in his interesting, but I venture to think, obscure Lecture on "Ideal Chemistry," published in 1880, has said that whilst "various hypotheses, both metaphysical and atomic, have been framed to explain what (chemical) combination consists in, such hypotheses have not thrown the slightest light upon the question." Yet in the same Lecture he makes two contributions towards an explanation—both of them illustrating the hopelessness of the task. "Combination," he says, "is the operation by which matter is packed into space." Again, he says that "we must enlarge our view of the nature of combination, so as to include under this term not only the combination of matter with matter, but the combination also of matter with space." I presume this must mean the combination of ponderable matter with the luminiferous medium which is supposed to occupy all space. In any other sense a combination of matter with space seems devoid of any intelligible meaning. On the other hand, although it is possible and even probable that the "Ether" may play some part in chemical combination, no light is thrown upon the whole operation by the mere suggestion of so vague a proposition.

Two facts, however, respecting Chemical Force are certainly known. One of these facts is, that the unions it effects do not depend on mere mass, but are essentially selective—that they are possible only between certain kinds of Atoms, and are comparatively easy or comparatively difficult between other Atoms according to relations which we cannot understand, but which, for the want of a better word, are called Affinities. The other fact respecting these unions which we know is, that they are absolutely governed by curious numerical relations which are fixed and unalterable, or which, if they vary at all, vary according to some other numerical rule, which seems generally, if not always, to be a rule of exact multiple proportion. It is the first of these two facts which is perhaps the highest mystery of all. The selective attraction towards each other which exists between the Atoms of particular substances is called their Chemical Affinity. But affinity, like so many other words of science as well as of common speech, is a word which, when applied to material Atoms, involves a metaphor. Affinity between living things means, ordinarily, blood-relationship. Affinity between minds and characters means, in a secondary sense, a likeness of dispositions or a similarity of pursuits. In neither of these senses can Affinity be applied to the ultimate particles of Matter. But Chemical Affinity is not only different from, but it

presents a positive contrast with, Affinity as understood in any sense analogous to these. The Affinity of Atoms is not only not founded upon likeness, but one of its commonest characteristics is that it is founded on unlikeness and on contrast. Homogeneousness is favourable to mere mechanical mixtures. But heterogeneousness is essential to most forms of chemical combination. Atoms combine, for the most part, not because they are like, but because they are radically different. It is now held that Atoms of the same kind may combine like Atoms of a different kind. But it seems doubtful if the Atoms in this case are not rather cohering than combined. At all events, in the language of Chemistry, affinity means nothing but the mutual tendency to combine—a tendency which may be so vehement as to be explosive, or so gentle as to be one of the slowest and most imperceptible operations of Nature. And then, when Chemical Affinity has had its way, we have a combination which is as mysterious as its cause. It is fundamentally different from a mere mixture or aggregation. It is essentially a Structure with energies as definite as its proportions. Under its influence the separate components may drop all the characteristics and all the properties by which they were recognised before; and the new compound acquires

other properties and other characteristics entirely different from those of any of its parts.

Now, amid all the mysteries involved in these facts—amid all the questions and problems which they suggest, and which are wholly unsolved, and are perhaps insoluble,—there is one characteristic of them which stands out as clearly as the light of day. These complicated automatic Forces of Nature are of such a character as to lend themselves to artificial manipulation in measures and degrees of inexhaustible variety. In them, more conspicuously, perhaps, than anywhere else in Nature, the most absolute fixedness and rigidity of "laws" is seen to be not only compatible with, but to be the one essential condition of, that largest freedom in the ultimate agencies of Mind which we can only think of as a freedom outside the physical chain of cause and of effect, but with boundless opportunity and means of acting upon that chain, and bending it to Purpose. Nowhere in Nature have such powerful and subtle instruments been placed in the hands of Will. We see and know this to be not only a possibility but a fact by our own very limited experience in the Laboratory. We see it and know it by the immense resources which even a very imperfect knowledge of Chemical Force has placed, and is daily more and more placing in our hands. We see it and know it, above all, in the nature of the

methods by which these resources are made available, and in which they consist. Do we wish to break up some natural substance into the elements of which it is composed, so that we may have some one of these elements separated from the rest, and so that it may serve some purpose which it will not serve when it is combined? We have only to introduce into the compound which we seek to break up some new element to which the Affinity of our desired element is stronger, and thereupon that desired element rushes to the nearer friend we offer to its embrace, and leaves all others with which it had been associated before. Do we wish, on the other hand, to make some artificial combination of elements which are generally separate in Nature, and so to produce a substance which we know will have special properties, and therefore some special use? Exactly the same method in principle must be pursued. We bring together and place in close contact, under known conditions of heat or of solution, elements which we know to have mutual Affinities, and which under those conditions will have those Affinities set free to act. And then, these conditions having been brought about, the chemical Affinities exert their force, and forthwith some new substance is born into the world with powers and energies the most subtle or the most tremendous. In the Inorganic world it may dis-

solve the most refractory metals, or rend asunder the hardest rocks. In the Organic world its very touch may be death to every living thing, or it may exercise on the Organism the most blessed virtue,—restoring the wasted tissues—reanimating the vital flame,—and carrying into the most secret recesses of Life the sweet influences of health. Such is the wondrous alchemy of Chemical Combination in the hands of Knowledge and of Power. Thus, whether our object be to tear asunder or to put together—whether it be analysis or synthesis—the mysterious forces and laws of Chemical Affinity give us the method and the means of attaining a wide range of appropriate purposes and intentions: and exactly in proportion to our knowledge of those Affinities, and of the conditions under which they can be brought to bear upon each other, by artificial combinations on the one hand and by artificial dissolutions on the other, we attain to higher and higher degrees of command over the most complex and the most powerful agencies in Nature.

Now it is precisely in this aspect of the manipulation of Chemical Affinity, or of the artificial uses to which it is put, that the System of Nature demands for the explanation of its phenomena the largest element of Anthropopsychism. It is quite true, indeed, that in this, as in every other department of Physical Causation, there are a thou-

sand cases in which Chemical Affinity is seen acting under no obvious control—acting by itself and of itself—or, as it were, by accident. And these cases are in the highest degree instructive; because they carry us on from the proposition that Chemical Force is a wonderful instrument of Purpose, to the farther proposition that when it is not under the control of Purpose—when it is not manipulated and managed—it would lead to nothing but universal inertia, and universal deadness. Chemical Affinity when left to itself would lead to saturation—to stable combinations—and these are incompatible with movement and with Life. In a former chapter I have alluded to an example which illustrates this distinction well. When oxygen combines chemically with metallic iron and forms the red dust with which we are all familiar, there is no suggestion of artifice or of structure. What is really artificial is not the combination, but the separation between oxygen and iron, because pure metallic iron, uncombined with oxygen, is one of the rarest of all substances in Nature, and its very existence now as a common material in the world is due entirely to the artificial handling of Chemical Affinities by the ingenuity of Man. When left to itself in the presence of oxygen as that element exists in a damp atmosphere, it speedily returns to what may be called its natural condition, which is that of

chemical combination with oxygen in the form of rust. So also when iron is left to its natural affinities in the bowels of the Earth, and when under heat it comes in contact with another very common element there, namely, sulphur, it enters into that combination which is so well known as pyrites or sulphuret of iron.

This is one of the innumerable cases of chemical combination which, when each of them is taken singly, and considered by itself, seems to be purposeless and purely accidental. It exhibits, indeed, the peculiar facts of Chemical Affinity in all their mystery, because we have no knowledge of the causes which determine the mutual attractiveness of oxygen and iron, nor of the real nature of the coalescence, nor of the causes which give to the combination of these two elements physical properties which are totally different from those which either of them possesses when alone. But there is no appearance of these two elements being brought together as it were artificially, so as to produce the particular substance which we know as the red rust of iron. As the world is constituted it is inevitable that they should come together. Oxygen is present in large quantities in every place to which either water or atmospheric air can penetrate, and it is hardly less ubiquitous as an element in other combinations, even when both air and

water may be totally excluded. Iron is the most widely distributed of all the older known metals. Mind, therefore, has no obvious share in such chemical combinations as the rust of iron. The same thing may be said, probably, of all the other chemical combinations which exist in that Province of Nature which is called the Inorganic. All the rocks and minerals, all the gases and the vapours of which the Earth is composed, are mixtures or combinations of about some 63 elementary substances, according to the Chemical Affinities which prevail between them under various conditions of dryness, or of solution, of dispersion, or of condensation, or of heat and pressure. The most precious and the most beautiful resulting compounds, the ores of metals, the porphyries, and the granites, and the tinted marbles, the crystals, and the gems—the getting and the showing of which have in all ages been one of the pursuits and one of the pleasures of Mankind,—have all been apparently produced by accident amidst the throes and pressures of gravitation, the fires of combustion, and the eruptions of volcanic force. They are found where these agencies have happened to place them and to form them,—sometimes ready for human use, at other times requiring the most laborious exertion to mine them, and to reduce them to the forms in which they can be made available. Each individual case of

chemical combination in all its immense variety of products, may seem to be a fortuitous concourse of Atoms brought about by the interaction and play of Forces blind in themselves, and blindly acting under no special or visible direction towards an intelligible end.

In this respect each bit of the Inorganic world may be like each bit of some great picture. A little pigment adhering to a patch of canvas may be all that could be seen in the one case. Some common elements naturally uniting may be all that is visible in the other. But both these aspects of the facts would be alike delusive. It is only when we stand back from a picture at a sufficient distance to take in the whole, that the separate patches of adhesive paint take their place as component parts in one general effect. In losing their significance as substance or material, they acquire a new significance as Art or Work. So it is in Nature, when we stand back from details and take a general view of the Chemistry even of the Inorganic world. There are a thousand things in that Chemistry which when looked at by themselves seem to be the merest accident; and yet when we do stand back from them and look at them in their proper place, we see that they fit in with other things of a different order, in endless connections of harmonious coincidence. They are accidents as we call them, but they are

accidents, perhaps, without which we can see that the conditions of human life would have been different, less happy, less convenient,—without which Man's art could never have been what it is,—without which he could never have built such houses or such ships, or constructed such machines as are now the indispensable instruments of his command over the resources of Nature.

And even more than this may be said of some of those curious chemical facts of the Inorganic world which, in themselves, may seem most fortuitous. The air we breathe and the water which we drink are, the one a mechanical mixture, and the other a chemical combination, on the specific properties of which all Life, as it is constituted on Earth, depends. We have no clue to the process by which our atmosphere has been made up of gases which are not in chemical combination, but are only diffused or mechanically mixed, whilst yet, like a chemical combination, the mixture is one of exact and definite proportions. It does not seem as if this process could be purely physical—that is to say, the mechanical result of the Physical Forces acting by themselves. There is no known law, in this sense, by which such a result could have accidentally come about. But we have a clue, and a very clear one, to the "reason why" this arrangement should be as it is. Oxygen, when alone, has

such fierce and unsatisfied affinities with other substances that if this gas were pure or undiluted no Organic structure could stand against it. And so, in atmospheric air it is toned down and softened, as it were, by a large admixture and diffusion of another gas, nitrogen, which is comparatively inert, and then to both are added in much smaller proportion another element, carbon, which is the food of Plants, and an indispensable ingredient in all Organic structures. Nor is it less clear why this mixture should be established in fixed proportions. Any variation in these would throw into confusion all the laws affecting the growth and respiration of the whole animal and vegetable world. Whether we regard these structures as adapted to the atmosphere or the atmosphere as adapted to them, there can be no question of the relations of Unity which prevail between them, nor can there be any question that these adaptive relations are not the work of chance.

Again, in the composition and in the properties of water we have a still more striking example both of the obscure nature and of the wonderful results of Chemical Affinity, as well as of the powerful instrumentality which it affords to Knowledge and to Power. That water, with its many special and peculiar properties, which make it the great natural antagonist of fire, should consist of nothing but two

gases, one of which is the most inflammable of all substances, and the other of which is the great cause and agent in all combustion,—this is, indeed, a fact which may well give us a high estimate of the mystery involved in the transforming power of Chemical Combination. And in the width and sweep of that transforming power we see the indefinite room which is afforded by it to special arrangement and manipulation.

In the working and management of this great fount and source of Energy, then, Nature is intensely anthropopsychic. That is to say, it is full to overflowing of combinations which have all the characters of manufacture and of Art. Water, without which our Earth would be a desert, and our own bodies would be dust, is an article which can be manufactured in the Laboratory even more purely than it is manufactured in Nature; but it can only be manufactured by first isolating the two constituent gases, and then by bringing them together under the conditions in which alone they can combine to form the new and totally dissimilar substance whose various and complicated properties make it one of the prime necessities of Life.

It is a favourite item in the belief of many Evolutionists that in the Ocean all Life began. And it is undoubtedly true that even now, when

the evolution of Organic Life has run a long course, the Ocean is far more rich in animal Life than the solid Earth. There is no zone or region of the Sea which does not swarm with Life. Its very substance is often, as we know, luminous with creatures whose numbers must exceed all our standards of numerical comparison. Not all the grains of sand on all the shores and on all the deserts of the Globe—not all the visible stars of heaven can approach their multitude. The very stones which the Sea covers for only a portion of the day are encrusted with innumerable hosts, whilst all the fronds of its vegetation and every square inch of its various deposits are full of legions of living things. Nor are the creatures which swarm in the Ocean creatures only of a low type of Organisation. They belong to every Order and to every Class from the lowest to the highest. Living together in close communion, sometimes as each others' guests and hosts, we have in the Sea living things with no visible structure, but with the wonderful power of separating from the water the almost infinitesimal percentage of lime and of silex which it holds in solution, and of building them up into exquisite forms of beauty: other living things with a high and very obvious structure, which have the same power of building homes and houses for themselves

of another kind: others again whose own external skeleton is more complicated than the finest jointed armour of the Middle Ages, and whose plates and scales are yet so arranged that each can grow round its own margin, and retain its relative place in the enlargement of the whole: others yet again in whose close articulations this operation is impossible, and which therefore have been given the power of extricating their own body from its coat and panoply of mail, and of reproducing the whole every year from the surrounding waters. Then, again, on all these creatures, more or less, there are others in innumerable multitudes which grow like plants and which bud like flowers; whilst around and overhead we have the earliest members of the Vertebrata in immense variety,—together with gigantic representatives of the Class, Mammalia, concealed under the outward form of fishes —some of them having brains nearest in proportionable size to the brain of Man. Nor are there wanting creatures which seem links and passages from marine to terrestrial life—the Dugongs, the Manatees and Seals, which are more or less amphibious, and some of which have limbs seemingly on the way from fins to legs. It is not wonderful, therefore, that the Sea should be regarded as the mother of all flesh. Water, in itself, constitutes a very large proportion of the substance of all

Organisms, and the life of most creatures living in the Sea entirely depends on the capacity of water to hold in solution a certain adequate amount of free oxygen wholly separate from that proportion of the same gas which enters into its own chemical composition. The gills of fishes and the various breathing apparatus of other marine Organisms have no power to decompose water—that is to say, to separate the oxygen from its chemical union with hydrogen. They can only appropriate the free or uncombined oxygen, which is dissolved or held as a mechanical mixture in the water. All marine life, therefore, depends on this property of water—that besides or over and above the amount of oxygen which enters into its own composition, it has power also to hold in solution another proportion of the same gas in a condition which leaves it free to enter into a separate combination with the circulating fluids of living creatures.

Here we have a cycle of adapted relations between the Organic and the Inorganic which is only one of many. Again, these relations cannot be accidental, and we see that the "firmament of waters," which covers by far the largest portion of our Globe's surface, has a constitution and properties which must have been determined before Life began, but which, nevertheless, had anticipatory relations to that Life which was to be. And yet

those relations are not the simple relations of physical cause and of effect, for water does not of itself generate Life, nor can it hold Life in solution as it can hold the salts of iodine and of potassium. The Intelligibility of Nature demands that we should recognise in these relations the work of Chemical Affinity in the Inorganic Province, working under conditions analogous to those under which we can ourselves work it, when we know and use the methods which it affords to our own Intelligence.

Nothing, indeed, can be more instructive than those methods, or the principles which they involve. For just as in mechanics the storage and the control and the distribution of Force by human device, show that the most absolute and rigid laws are the best servants of Contrivance, so in chemical science the same great principle receives a yet more signal illustration. It was the Chemistry of Nature which long concealed from Man not a few of the most valuable materials of his industry, and it was only when he discovered how richly that Chemistry lends itself to his own management and control that he came into possession of them. One principal part of the history of Civilisation is the history of the chemistry of the metals. There is a deep significance in that classification of the stages of human progress which has been founded on the successive

use of Implements of stone and of bronze and of iron. So completely do the laws of Chemical Affinity when uncontrolled cover up and conceal the metals, that even now for the most part we forget how many, how various, and how curious they are. Our common impression would be that of the various substances in Nature a small minority are metallic. Whereas, on the contrary, the fact is that of the sixty-three elementary substances into which, according to our present knowledge, all material combinations can be reduced by chemical analysis, the great majority—some forty-eight—are metals. The progress of chemical science is discovering for some of these metals refined uses and applications which are already numerous, and which may become more numerous from age to age. But in respect to the greater proportion of these metallic elements, the utility of them lies in the natural combinations in which they are actually found. Potassium is of little or no use except in the form of Potash. Sodium is of little or no use except in the form of Soda, or of the chloride of Soda, which is common Salt. And so in a great majority of cases the metals are valuable only in the combinations which they form with substances which are non-metallic.

Of all the metals, there is only one which in Nature is generally found in the metallic state, either pure or with such slight alloy as not to

detract from its lustre and its beauty. That metal is gold. But although on this account it was probably the very earliest of all the metals to attract the attention of Mankind, and although on the same account it has been taken from the earliest ages as the chief standard of value, and is pre-eminently called the "precious metal," it is in respect to everything except ornament the least useful metal existing in the world. As regards the other metals, it is Chemistry alone which explains the order of precedence in which they have been discovered and applied to use. It is Chemistry alone which explains how it came to pass that the most useful of all metals, iron, is at once the commonest, the most widely distributed, found in the greatest masses, and yet was the last to be known and to be separated from the other elements with which it is ordinarily combined. The explanation is very simple. The commonest ores of iron are those in which the metal is combined with oxygen or with carbonic acid. In both these cases the combination has no metallic appearance, and the invaluable properties of the metal are neutralised and concealed. On the other hand, the principal metal which came earlier into use, copper, is, though much less common than iron, more usually combined with sulphur, and in this form the metallic lustre and appearance is rather enhanced than injured. There

are no more beautiful ores than the sulphurets of copper; none more calculated to attract the notice of primeval Man. It is true that iron is also very commonly combined with sulphur, and that the sulphurets of iron are as obviously metallic as those of copper; but it is equally true that the affinity between iron and sulphur is so vehement that it is most difficult to separate them completely; and that the smallest percentage of sulphur is destructive of the most useful properties of iron. Hence it came that a metallurgical operation which may seem to imply very advanced knowledge, namely, the formation of an alloy between copper and tin, and the application of this alloy to the manufacture of implements, was an operation which apparently in all countries long preceded the much more simple and the much more effective operations which suffice for the production of iron and steel.

All these operations are in their nature chemical, and each one of them illustrates how Chemical Affinity is the most supple and subtle of all tools in the hands of Knowledge and of Purpose. One fundamental principle lies at the root of all, and that is that the elements which are to be broken up from some existing combination, must be presented to other elements in the order of new affinities, and under such conditions, first of contact and then of heat or of solution, that these affinities have the

freest opportunities to act. Thus if we wish to separate iron from the oxygen or the carbonic acid with which it is combined in Nature, we have only to melt it in contact with some other element which has a still greater affinity than itself for these substances. Under this discipline of arrangement they can be made to leave the metal, and combine in preference with other bodies.

Now, arrangements of this kind are exclusively the work of Mind, and it is in the conceiving of them, and in the effecting of them, that its supremacy consists. The selection of the elements which are to be placed in contact, and the preparation of the chemical or physical conditions under which that contact is to be effected,—these are the essential operations which must be conducted under the guidance of knowledge, and with a view to the attainment of a specific purpose. For the attainment of any purpose Man must use the laws of Nature as he finds them, and those laws, as regards Chemistry, demand that he should know the facts, and know how to use the facts, respecting the selective affinities of one element for another. In order to separate, he must know how to join; and conversely, in order to join, he must know how to separate. For the fundamental principle of all such operations is, that very often the separation

of one element can only be effected by contriving for it some new combination with others. Substitution is the key to all the higher products of Chemical Analysis, and to all the higher methods of Chemical Synthesis alike. Many of the results thus attained are highly artificial, that is to say, that although they are the product of natural affinities, these affinities are brought to act under conditions that could never occur without management and contrivance. Thus, to take a particular example, the metal potassium has such affinity for oxygen, that it cannot be reduced to the metallic state nor kept in it, except by very elaborate operations and precautions. If this metal be exposed to the air, it rapidly attracts the oxygen; and if it be thrown into water, the combination is so violent in its energy, that the strange spectacle is exhibited of water bursting into fierce combustion. This is a very simple case,—the case of an element which under purely natural conditions refuses to remain uncombined. But exactly the same principle applies to the converse case of innumerable combinations in which the elements under purely natural conditions tend to separate and cannot long be held together, because they have, as it were, been compelled to unite under conditions which are highly artificial. These artificial conditions very often can with difficulty be maintained, or possibly they cannot

be maintained at all, beyond a certain time. This is the case with many compounds in the mechanical arts, and especially in the pharmacopœia, —compounds which, being thus highly artificial, are consequently liable to decomposition and decay. Chemical Affinity, under control, was employed to make them; but Chemical Affinity, escaping from control, cannot be hindered from unmaking them again. All such compositions have a character of their own. In one sense they are natural, in another sense they are not. They have all been made by natural laws, but they belong to a System in which purely Physical Causation is subordinate and not supreme. In them the laws of Chemical Affinity have not indeed been violated, but they have been manipulated. They have been made to do work which they never could or would do except under the discipline of Mind, and for the accomplishment of its aims.

CHAPTER VII.

The Elementary Constitution of Matter in Relation to the Organic.

IN the last chapter we have seen the artificial character and aspect of the comparatively few chemical combinations which Man can effect in the Inorganic Kingdom of Nature, and we have seen too that in that part of the System of Nature there are some mixtures and some combinations of primary magnitude and importance which seem to be equally artificial. But there is another great Division of Nature in which Man cannot work at all, and yet the whole of which is occupied by combinations on which the same stamp and character are still more visibly impressed. This is the Kingdom of the Organic. In this Kingdom all the chemical combinations which are employed are in the highest degree artificial, complicated, and what chemists call "unstable." Here Chemical Affinity is seen working under, as it were, a double servitude.

It is called upon to make up certain special combinations of material, in order that these may again be worked up into special structures under the power of that other and higher kind of Energy which we know as Life. In this series of operations, Chemical Affinity may well be called by the title which is the traditional title of the Popes of Rome. It is the "Servus Servorum Dei."

Here, again, in order to see clearly wherein the Unity of Nature is to be really found, we must observe distinctions which the language of science is in danger of confounding. We talk of "Organic Chemistry," and the phrase may have a legitimate meaning, if it be properly understood. But there is a treacherous and perilous ambiguity in it. It is curious to trace the loose and deceptive passages of meaning by which phrases of this kind are made to introduce and perpetuate the grossest fallacies. Organic Chemistry means the chemistry of Organs. But the chemistry of Organs may mean either of two very different things. It may mean the chemistry which makes Organs, or it may mean the chemistry which Organs make. Now, in the first of these two meanings it is nonsense. There is no mere chemistry which can make an Organ. There is no laboratory which can turn out, or build up, even the lowest living Cell. But in the second of these two senses, the phrase Organic

Chemistry has an important meaning. Life, as the Energy of living Organs, has undoubtedly a chemistry of its own; that is to say, it makes up compounds which no other agency can make.

But before examining further what Organic Chemistry is, in the only sense in which it corresponds to the realities of Nature, let us examine a little more carefully the other meaning in which it corresponds with no reality at all. For let it be clearly understood that mere Chemical Affinity, so far as we know, cannot produce any "Organism," however simple or however low. It can only produce the material substances out of which, by a separate process, Organisms are formed. Chemical Affinity, again, when an Organism has been formed, can and does produce, under the special kind of energy to which that structure is due, and which is indwelling there, new combinations which are sometimes called "organic," not because they have Organic Structure or anything approaching to it, but because living Organisms alone can make them. But, in the proper sense of the word, it is obvious that nothing ought to be called organic which has not itself an organic structure. Now Chemical Affinity, so far as we know, can give rise to no structure beyond the structure of the lifeless Molecule. What that elementary kind of structure is we have no knowledge until we know the ultimate nature of Chemical Combination.

But we know that it is not a structure at all in the same sense in which an Organism is a structure. The simplest living "Cell," whether of vegetable or of animal Life, is a structure of a kind such as no mere chemistry can produce. On the other hand, the substance of which that Cell is made is a chemical compound, and generally a chemical compound of the most complicated nature. Moreover, the Cell is again capable of calling upon chemical affinities to provide for it new material, on the one hand, and to take away from it, on the other hand, certain old material in the form of degenerate combinations which are waste. Properly speaking, therefore, there is no chemistry except the chemistry of the Inorganic, although the unorganised or elementary, lifeless, and comparatively structureless compounds which chemistry is alone competent to produce, are the necessary materials of all living structures. Accordingly, when chemists are compelled to define more accurately what they mean by Organic Chemistry, they are obliged to confess that all they mean is the chemistry of the "Proteids," or of the "Hydro-Carbons." That is to say, it is the chemistry which produces a definite series of compounds (chiefly of Hydrogen and Carbon), which Life in living Organs is alone competent to produce. In this sense, but in this sense alone, Organic Chemistry is separate from other chemistry—that is to

say, it represents a separate group of compounds—just as the chemistry of the "Aniline Dyes" is separate from the chemistry of the "Alkaline Metals," or the chemistry of the "Cyanogen Compounds" is separate from both.

Hence we see the futility of the controversy which has been so keen upon the question whether the Chemistry of Life is or is not the same as the Chemistry of the Inorganic. In one sense it is the same, in another sense it is different. It is the same in so far as the elementary substances contained in living bodies, and in the products of living bodies, are elements identical with those which exist in lifeless things. It is different in so far as these elements are worked up into combinations which are effected by no other agent than Vitality, and exist in no other department of Nature except that of living things. One of the great peculiarities connected with them is the very small number of the elements concerned, and the extreme and subtle complexity of the combinations which these elements are made to assume. So great is that complexity, that it escapes all the ordinary formula of chemical notation, and some writers now even contend that it casts serious doubt on at least some parts of the Atomic Hypothesis, which is the best explanation of almost all other chemical combinations. On

the other hand, there is no reason to believe that in the compounds which are called Organic the ultimate laws of Chemical Affinity are altered or suspended. The impression which these so-called organic compounds give to chemists is that they are effected on the same fundamental principle on which all other combinations are effected, and that is the principle of the ultimate elements being so brought together that they are compelled into arrangements amongst each other, and substitutions for each other, into which they never are compelled except under the energies of Life. The phrase which chemists always adopt, and are obliged to adopt, in order to convey to others the image or impression which these compounds leave upon the mind is this,—that they are "built up."

Here then, again, as in so many other departments of science, we find that the anthropopsychic or teleological interpretation of Nature is the inseparable and insuperable result. Nor is it less curious to observe how even the apparent exceptions, which are seized upon and dwelt upon as proving that Life has no special chemistry of its own, are exceptions which, when cross-examined, give evidence against their Counsel. We are told sometimes in great triumph that certain products which are called Organic can now be made by human artifice in the Laboratory. But two questions have to be asked

concerning this boast, and in both of them the answer dispels the argument. The first question is, What are the combinations which can be thus made? and the second question is, How is the making of them effected?

The answer to the first of these questions is, that no fragment of Matter which can strictly be called Organic—that is to say, no fragment of Matter having Organic Structure—has ever been made in any laboratory by the hands of Man. What he has succeeded in making has been some one or two of the unorganised compounds which living Organs make, or rather which are among the products of their decomposition and decay. Urea, one of the waste products of the animal Organism, is the principal triumph of what is ambitiously called the "Organic Chemistry" of the Laboratory. There is a hope and a promise, indeed, of greater triumphs of imitative skill. Some progress seems to have been made in "building up" in the Laboratory some of the valuable "Alkaloids" which enter into the composition of certain vegetables. But none of these successes of chemical manipulation, even if they were multiplied a hundredfold, bring us one step nearer to the manufacture of anything which really belongs to the Kingdom of the Organic. We might as well boast of making an "Organic" compound when we have made, as it is easy to do, sulphuretted hydrogen

or ammonia. These, too, are among the combinations which are Organic in the sense of being given off by Organisms either in action or in decay.

But the answer to the second question is even more important than this answer to the first. How has Man succeeded in manufacturing the so-called Organic compound of urea? The answer is, by "building up." By careful analysis he has first ascertained the elements of which it is composed, and again by a highly artificial and elaborate manipulation of those elements he has got them to combine in the required proportions. Is not this an analogy which strengthens the conclusion which it was intended to refute? For just as Chemical Affinity has been made the servant of a little knowledge and a little skill in the manufacture of urea, so to all appearance has it been made the servant of knowledge and of skill which by comparison is infinite, in the "building up" of those subtle, delicate, "unstable," almost evanescent compounds which are the requisite materials of living Organs.

And here I must return to the great distinction which has already been referred to, but which cannot be too constantly kept in mind. Chemical Composition is one thing—Organic Structure is quite another thing. And if "building up" is the anthropopsychic metaphor which chemists are compelled to adopt when they wish to express the process

by which the mere substance or material of living Organs has been prepared, with how much greater force must this analogy be applied to the farther and wholly different process by which the composite material has been farther "built up" and woven into Organic Structures? In the Inorganic world, indeed, there are many arrangements of material which are so regular and formal that they, in a certain sense, may be called structural; and these arrangements are effected by a kind of energy which, if not purely chemical, is in such close alliance with it that there is certainly some very near connection. Such is the structure or the forms of crystals—definite shapes which many substances assume when passing from the liquid or from the gaseous state into the condition of solidity. But the structure of a crystal is due to nothing but the simple or mechanical aggregation of its molecules along definite lines of force. There is no internal structure in a crystal different from the exterior. A cubical crystal is made up of an indefinite number of little cubes. An octohedral crystal is made up of an indefinite number of little octohedrons. Through and through the whole mass there is a perfect uniformity in the method of molecular aggregation. It is a mere mass of molecules compacted together in a particular shape. It is a mere congeries of identical units marshalled

and drilled into coherence in a certain form and order.

In all this there is an immeasurable distance and difference between the Organic and the Inorganic. It is only by inventing forms of speech which suppress this difference that the phraseology of pure Materialism can be applied with even a semblance of sufficiency to the Structures which are at once the work and the abode of Life. "Molecular arrangement" is one of those phrases which have been thus invented, as expressing the fundamental principle on which all differences consist in material structures, whether dead or living. I do not think that this phrase is adequate to express or to afford any explanation of the differences which prevail even in the sphere of the Inorganic. There is something in the nature and effects even of mere chemical combination which cannot be conveyed in the terms of any purely mechanical conception. Yet on this subject the common phraseology of scientific men has hardly advanced at all since the days of Lucretius. The Ancients had an idea that the Atoms of matter were held together by means of "hooks" mutually intertwining. And so in our own day the most eminent physicists are obliged to have recourse to the analogous conception of the Atoms in chemical combination being "linked," or "interlocked," or "tightly clasped," or "paired,"

or "grouped" together. This kind of phraseology is all very well, provided it be borne in mind how dim and how distant the analogy is, and how powerless it is to express the facts which Chemistry has revealed. The only one of these facts which it serves to keep in mind is that the separate Atoms are never lost or wholly merged, because they can always be recovered again in their original integrity. But during the combination we do not know how they are affected. It looks very much as if they were absolutely interfused, in such a sense and to such an extent as almost to undermine the doctrine that "Impenetrability," or the absolute Occupation of Space, can be really reckoned among the inherent properties of Matter. No image suggestive of mere grouping in any form, however intricate, can be other than delusive and empty of the truth. Chemical Combination is essentially dynamic, and not mechanical. Moreover, it is selective, and not indiscriminate. No mere method of arrangement among the particles of Matter can produce the changes which Chemical Combination makes. We cannot convert a brick house into a marble palace by simply relaying the bricks in an altered fashion. And yet this would be a transformation very simple and very easily conceived when compared with the transformations which are effected by the combinations of Chemical Affinity. Under

the power of it, Atoms which are in themselves passive and inert become possessed, when combined, of the fiercest energies. And vice versâ, Atoms which when alone are intensely active, pass when combined into a passive state, and thus a perfect equilibrium may be established among Forces which no other agency could control.

But however great and insoluble may be the mystery attaching to the ultimate nature of these laws of Chemical Affinity, we can at least read in them the same lesson on the relation which they bear to the Organic world which we have already read in them on the relation which they bear to the Inorganic. We can at least see very clearly what tools and materials they supply for the "building up" of Organic Structures. I have spoken of this lesson as it comes home to us in the Laboratory, where the advancing knowledge of analysis is leading every year to more and more elaborate possibilities and results of Synthesis. All these results are in the lower Kingdom of the Inorganic. But in that Kingdom they are veritable edifices; compounds "built up," as the chemists say, by the dexterous use of Chemical Affinities, and by the artificial procurement of the conditions under which they must enter into some foreseen combination and produce some desired effect. But the most elaborate and ingenious of these combinations

are after all structures only in the same sense in which crystals are structures also. They may be more or less elaborate—more or less artificial—more or less imitative of the combinations which are found in Nature, and which give value to one or other of her products. Yet whatever structure they have is always purely and merely chemical. They are mere symmetrical and uniform arrangements or combinations of Atoms and of Molecules. But the structures which are "built up" by Life with the help of Chemical Affinity in the Organs which are its own home and seat, are structures in a very different sense indeed. They are no mere aggregates of Atoms or of Molecules, each like the other, and all similarly stuck, or "hooked, or linked, or grouped" together in identical forms indefinitely repeated. Nor are they even mere chemical combinations. In every bit and particle of every living Organism, Difference and not Identity reigns supreme,—Difference not necessarily of chemical composition, but of physical constitution,—Difference not passive but active,—Difference not of substance but of function,—Difference not in what the Atoms and the Molecules are, but in what they are set to do.

Segregation and not aggregation is the fundamental operation of constructive Organic Chemistry. It is first the selection and separation of certain Atoms

from pre-existing compounds, and then again the fitting of these to others which also must be selected with a view to qualifying them for definite functions. And in every Organism, for the doing of an almost infinite variety of things, it is farther necessary that out of a very few elements an almost infinite variety of structures should be "built up." How infinite that variety is can only be appreciated by those who have made a study of microscopic sections of vegetable and animal tissues. The beauty and complexity of these tissues even in Plants is very great; but they are simplicity itself when compared with the tissues of the higher animal Organisms. Even the very word "tissue," though perhaps the best we have, suggests but a feeble image. Every animal Organism is Structure through and through. Its whole substance, and, as it were, its whole essence, is Structure and nothing else.

The unit of Organic Structure is the Cell, and every living Cell is a whole world in itself, with indwelling capacities and powers as various as the ultimate causes of them are mysterious and inscrutable. There is a whole class of animals, many of them of exquisite form and beauty, which are held to consist entirely of one Cell. In every higher Organism the activities of the Cell are mysteriously co-operative and subordinate. But although the causes are inscrutable, the ends and

objects,—the purposes and functions,—of every Organ, which is built up of Cells, can, for the most part, be defined and understood. In the first place, there is one great end governing the whole, and that is the establishment and maintenance, in the midst of other things, of a living Unity—an Individuality with a Will of its own,—a Personality—which shall be complete in itself, and more or less completely separable from all surroundings. Given certain physical conditions which we see as a fact to be essential to the existence and enjoyment of Life, then every particle of every Organism is simply part of the required mechanism for the meeting of these conditions; and its only explanation to us consists in the perception of its relation to this purpose. Throughout each and every Organic Being the primal combinations, and the primal units of living structure, are shaped and moulded into forms which, as regards their purely physical and organic office and functions, have all either a purely chemical or a purely mechanical explanation. The preparations, for example, of acids and of emulsions for the dissolving of foreign substances is a perfectly intelligible preliminary and preparation for the processes of digestion. The elongation and flattening and longitudinal arrangement of Cells into tubes of many sizes, some large, some microscopically small, are, in like

manner, perfectly intelligible preparations for the conveyance of circulating fluids. The condensation and elongation of the same Organic Units into the cords and threads and fibres of nerve-tissue, and the enclosure of this most highly organised substance again within protecting sheaths, are not less intelligible provisions and adaptations for the conduction of these sensory movements in which galvanic currents are probably concerned.

Perhaps no Organic substance, whether we regard it in its composition, or in its structure, is a better example of complexity than the blood. We speak and think of "atoms," even in the Inorganic world, as endowed with properties so wonderful and mysterious that some men doubt their existence, and others, like Sir J. Herschel and Professor Clerk Maxwell, can only regard them as "manufactured articles." But in the blood we have an example of a fluid, in which one essential element is a multitude of bodies so minute that to the Ancients they would have perfectly represented all that they could conceive of Atoms. I refer to those bodies which are called the "corpuscles" of the blood, bodies so minute that one cubic millimetre of the fluid is estimated to contain five millions of them—that is to say, that one cubic inch of blood would contain eighty millions of these corpuscles. Yet each one of these corpuscles is an Apparatus in itself

It is not a simple body, but complex and full of differences. It is a framework in which are embedded various compounds, and particularly the "Hœmoglobin" to which the whole liquid owes its peculiar colour. This substance is among the arcana of Life. There is no human priesthood privileged to go within its veil. The chemist can analyse it indeed, and can tell us of the elements of which it is composed. And what he does tell us is curious enough. Alone of all the constituents of the body this mysterious "Hœmoglobin" contains iron. Besides this, it contains the usual three gases with a special supply of oxygen, whilst it holds also sulphur and carbon in definite proportions. But this is not all. The framework of the corpuscles in which this precious material is held entangled or enclosed, is so complex in its constituents, that it may be said to contain a whole laboratory of chemical elements. Besides chlorine, phosphorus, and sulphur, there are the four metals, potassium, sodium, calcium, and magnesium.* And then, in addition to all this world of complexity in the red corpuscles, there are besides another vast number of corpuscles which are uncoloured, in the proportion of about 1 to 350 of the red.† These also are —perhaps even more than the red corpuscles—

* Foster's "Text-Book of Physiology," p. 29.

† Gamgee's "Physiological Chemistry," vol. i. p. 124.

among the secretest things of Nature, for they are not easily distinguishable from the separate Organisms which are the lowest forms of individual Life. These colourless corpuscles are said to move like the Amœba—a well-known microscopic Organism—and they seem to pass through the walls of all the vessels as if there was nothing in their way.

The ultimate cause of the necessity for all these things is beyond us. That is to say, we do not know why Life could not exist and flourish without a physical machinery so highly complex. But given the necessity of the circulating fluids of the body being placed in contact with the oxygen of the atmosphere, then this necessity explains the preparation of some "Organ,"—that is to say, of some special Apparatus,—in which these fluids may have the requisite exposure to atmospheric air, and may, nevertheless, be kept from spilling. This, again, requires that the walls of the vessels should have a certain physical constitution and structure, through which certain elements can pass freely, whilst at the same time the liquids are prevented from escaping. Among all the wonders of Nature, there is perhaps no wonder greater than the Circulation of the Blood. Its physical, its mechanical, its chemical, and its vital phenomena are all equally complicated, and are all intimately interwoven. The current of

the blood is like some great river, now running in one wide channel, now dividing into a thousand rills, but everywhere bearing in its stream vast multitudes of little rafts more numerous than all the ships and boats and navies of the world, each laden with a precious cargo, and each yielding up that cargo as well as its own materials to repair and reanimate the tissues which are suffering loss or exhaustion from the work and the waste of Life. Still more purely mechanical are the necessities and the methods which explain the bony structure of the animal body, which, whether in the position of an external or of an internal skeleton, is an essential part of the Apparatus belonging to all the higher forms of Life. The physical necessity is clear. Every muscular movement must have its fulcrum, and the demands of gravitation require that soft substances of considerable weight should have some rigid support to save them from collapse.

These are but a few examples of the one great principle on which all Physiology depends. They are examples which give us some idea of the immeasurable distance that lies between the Organic and the Inorganic. It has been said by a very eminent man that "the process of development of the egg, like that of the seed, is neither more nor less mysterious than that in virtue of which the molecules of water, when it is cooled down to the

freezing point, build themselves up into regular crystals."* It may be quite true, indeed, that the crystalline arrangement of Matter is in itself mysterious, because we do not know the ultimate source or nature of those "lines of force" along which the particles of Matter are compelled to range themselves into definite forms. But if it be possible to have any degrees in the scale of ignorance or of mystery, where all is profoundly dark, there is really no sort of comparison between the mystery which attaches to the processes of Crystallisation and the processes of Organic Structure. As mere processes they are really incommensurable. There is a fundamental difference between all forms of mere orderly aggregation and even the very lowest form of living structure.

In one aspect, indeed, it may be said with truth that there is less mystery in the Organic than in the Inorganic Kingdom, because the processes of Organic growth, however mysterious and indeed inconceivable they may be as processes merely, are at least illuminated by the clearest light in their relation to fitness and utility. But in crystalline forms there is no obvious utility. I do not know that we should necessarily lose anything of essential value to human life if all substances were as amorphous as many of them actually are. But at least in

* "Science Primers—Introductory," by Professor Huxley, p. 92.

all Organic Structures the light of adaptation shines like the Sun in Heaven. In this lies the pre-eminent interest attaching to Biology. It is a branch of science which, in proportion as it concerns the highest department of Nature, becomes more and more anthropopsychic, because above all others it essentially consists in the mental recognition of structural developments which advance along lines of adaptive purpose. For in the course of this development, it is above all things remarkable, that always in the earliest stages every step in growth must go before the use which it is to serve when finished. No Organ can be used until it is fit for use, and the gradual adaptation to that use, through innumerable stages of growth and of development, is an adaptation which is always anticipatory and prophetic. As regards each individual Organism in its progress from the Ovum to maturity this is an universal and an unquestionable fact, which proves that the serviceableness of Organic Structures for particular functions must, under any theory, whether it is called Evolution, or whether it is called Creation, have existed in preparation before it can have existed in fact.

It has often occurred to me that this same order and succession of events may be the real explanation, in some cases at least, of the strange and mysterious phenomena of rudimentary Organs, sepa-

rated from all actual use, or possibility of use, in certain animals. On the theory of Evolution every existing creature must have existed potentially in the earliest Germs. That is to say, those Germs must have had an innate tendency to development along certain lines of structure. Nothing therefore is more natural than that Structure should sometimes run forward, as it were, upon those lines, and should become visible quite apart from the actual occurrence of conditions calling for its use. If, for example, the earliest mammalian Germ had "potentially" in it all the latest developments of the Class, it is quite intelligible that some portions of the perfect structure should be traceable in creatures which are never destined to have them completed, or to need their services. Indeed the general principle which is involved in this idea is recognised in a well-established doctrine of Comparative Anatomy—namely this,—that all Organic growths which are highly specialised and apparently separated from others, are in reality nothing but exaggerated developments of some bit or rudiment of structure which exists throughout the whole Class to which it may belong in Nature. In these bits of structure the future development may be said to have pre-existed. Without these roots the growth could not have been. In them therefore the Previsions of Nature are, as it were, embodied. In them we

have a physical basis for the conception, apparently ideal and almost transcendental, of the Potential existence of all creatures in the earliest germs.

A striking illustration of this idea and of its corresponding doctrine in Comparative Anatomy, is to be found in Professor Flower's most interesting lecture on the Origin of Whales.* Probably there is no growth in Nature which seems more absolutely unique, and separate from all others, than the Baleen or Whalebone apparatus which fills the mouth of certain genera of Whales, and constitutes the only Organ by which they can seize and detain the myriads of minute creatures which form their food. Yet Professor Flower has clearly identified its origin as only a modification of a bit of structure which exists in almost all mammals,—the roots of it, as it were, being in certain ridges and papillæ of the Palate, —these being specially visible in that most singular creature the Giraffe. It is at least possible that this also may be the explanation of these other bits of structure which have been supposed to be aborted by disuse. In the metamorphoses of Insects, certain Organs of the perfect Insect, or "Imago," are sometimes visible as rudiments in the imperfect or larval form, although in that form these rudiments have no use or function. In these cases, all such rudiments have their interpretation not in the past, but

* "Nature," No. 713, Vol. 28.

in the future. They are fashioned and prepared not by use, but for it. And indeed this principle is declared by a high authority to be the principle which governs the whole process of Development as it is exhibited in the wonderful transformations through which Insects go. Sir J. Lubbock tells us * that whilst these transformations as a whole are in a sense the same in all cases, they differ widely in the rapidity with which different Organs are developed in different Insects; and he adds that the condition of those Organs at the time of birth, or hatching of the egg, depends mainly on the manner of life which the larva is "intended to lead." Those Organs are well developed which are requisite for immediate use in the larval state, whilst those other Organs which are destined for a future stage are present only in rudiments or in germ. We may be quite sure that the same principle has governed the development of the whole animal creation, and if so, we may be equally sure that rudimentary Organs are to be expected everywhere in Nature, and are everywhere open to the same interpretation.

It is, as we have seen, the accepted doctrine with the Biologists of Evolution that new Organs are never really new, but everywhere and always simply developments of some pre-existing structure. It is a

* Transac. Linnæan Society, Vol. xxiv. On the Development of Chloëon.

necessary consequence of this doctrine that such developments must begin with stages anterior to the possibility of use, and in this stage they may easily be confounded with those which have become atrophied by disuse. The most prominent and startling example of this phenomenon which perhaps is now to be found in Nature, is the existence in the same great group of the Cetacea, or Whales, of rudimentary bones representing the pelvis, and the other bones of the hind limbs of terrestrial quadrupeds,—a fact to which we must now add the farther discovery that the muscles also which are appropriated to the movement of these hind limbs in the terrestrial Mammalia, are to be traced in the anatomy of the Whales in a like condition of complete dissociation from the possibility of use. It has been usual among the disciples of the Darwinian hypothesis to assume that in all cases these useless Organs are not rudiments but remains—not roots which may yet have the opportunity of flourishing, but branches of an old stem which has decayed and has left them as wrecks behind. It is needless to point out that both of these suppositions are equally consistent with the Theory of Evolution—both equally involving the idea that the most extensive changes in species, involving both form, and food, and habitat, are quite possibly within the range of development through ordinary generation. But if we assume

that in all cases where such useless members are found, they are always remnants, and never germs —that they always represent members which were once in full development, and in actual use, and never represent members which are merely capable of development in the future,—then we are no nearer than we were before to the real Origin of Organic Structures. It obliges us to suppose that the ancestors of Whales were once terrestrial quadrupeds, and in that case we start with the conception of hind limbs, and of the Quadrupedal Mammal, fully formed and perfectly developed. Whereas, if we accept the possibility of useless Organs being the beginnings and rudiments of structures which are there because the Germ has always within it the tendency to produce them, then we catch sight of an idea which has the double advantage of going nearer to the Origin of Species, and of being in harmony with the analogy of natural operations as we see them now.

No one knew better than Mr. Darwin that the weakest part of his theory is that which assumes variations to be accidental, and the successful variations to be the mere "selected" survivors of thousands which have arisen and died because they did not happen to coincide with favouring conditions. Indeed he avowed that this part of his theory was merely provisional, and nothing more

than a confession of our complete ignorance of any definite Law in the phenomena of Variation. Believing as I do in the Reign of Law in Nature, and that there is no established order of events which can possibly be accidental, I cannot doubt that if Species have been begun and established through birth and ordinary generation, the rise and establishment of every variety has followed a predetermined course, and the mould of every new Organ and every new development has been implicit in every Germ. We know this to be so within the limits of Specific Forms, in every existing ovum: and it is no more difficult to believe that the same principle holds good for every deviation from those Specific Forms which may lie or have lain in a more distant future. How it is so is, indeed, in the highest degree inconceivable. Solomon asks, "Is there any taste in the white of an egg?" But there is another question much more significant. Is there any structure in the white of an egg? None that can be detected by any human method of examination. Yet out of that material, by the application of nothing beyond a little heat, the most elaborate structure is developed along lines of growth which are rigorously predetermined. And if we see this to be the fact in the case of an egg, and in the case of every seed, where no mould is visible, it seems much more easy to conceive it in cases where the

moulds of new Organs can be actually seen as rudimentary structures useless to the individual creature which contains them. And then it is always to be remembered that even if we suppose all visible rudiments of Organs to be invariably relics of the past, we know that some other set of Organs must have been on the rise as a substitute for those which were in course of atrophy and decay. If Whales, for example, are indeed descended from terrestrial quadrupeds which had a fully developed pelvis and posterior limbs, then the new Organ fitted for the propulsion of the animal in water, which is almost exclusively the tail, must have existed first in germs, and then in stages of preparation, before its use was begun and before that use was perfected. In any case, therefore, we come back to the idea of all Organic growths being implicit in their respective Germs. It is quite true that in Nature as we now see it these Germs are always born from pre-existing Organisms. But our Reason tells us that this process must have had a beginning, and science, in so far as its evidence is available, indicates very clearly successive stages of creation,—and times comparatively recent when all existing genera began to be.

The dictum seems to be true now, "Omne vivum ab ovo." But the converse proposition, "Omne ovum ab vivo," would involve us in an Eternal

Series with no Beginning. It can be true only in that transcendental sense in which we can affirm that every Germ must have come from some great primal Source and Fount of Life. But all reasoning and all evidence goes to establish the conception that each of these Germs has now, and has always had, its own fixed and predetermined line of march. In its wonderful, invisible, and incomprehensible structure, every Ovum does not grow up to the uses which are to be. We strain our imaginations to conceive the processes of Creation, whilst in reality they are around us daily. Perhaps if we had been present at the birth of some new animal Form we should have seen nothing very different from, and certainly nothing more wonderful than, we see now. It is only familiarity that has veiled their mystery. It is only thoughtlessness that makes us think that we are not even now in the middle of a truly Creative Work. It is most probable that at no stage of it, if we had been staring with all our eyes, and listening with all our ears, would we have seen or heard anything which is not to be seen and heard in the world around us. The first introduction of a Germ would probably have been invisible. From the Beginning Creation would have seemed to us a growth and not a manufacture. Nor is it conceivable that there should have been then a wider difference between the first Germs of things, and the

Forms and Functions which were to be developed out of them, than the difference which in this respect prevails in the existing world. For this difference in many cases amounts to the most absolute contrast, and extends to every feature which is recognisable either by the senses or the intellect. Nor is this contrast confined to cases in which fragments of matter apparently formless swell and grow into complicated structures. It extends to cases in which creatures apparently perfect, and which are certainly highly Organised, become changed in everything which constitutes their visible identity. When we think of the mystery involved in the metamorphoses of Insects and in the corresponding phenomena of alternate generation in other classes of the Animal Kingdom, we must see what unlimited possibilities of Creation lie open in methods which are in full operation round us. In the higher animals the development of Germs is carried on in vital and physical connection with the perfected Organism of the mother, and the cycle of changes which lead up to the completion of the parent Form is a cycle which thus appears to be wholly governed by the surrounding medium. But when we look at the metamorphoses of Insects, no such delusion is possible. A creature which to all appearance is fully formed, and which has led a separate and independent existence, suddenly lays itself to sleep. In that

condition, without any food,—without any contact with any directing physical agency external to itself,—its Organisation is wholly altered—its whole body is re-arranged—its old members dissolve and disappear,—new members emerge, and in a few days or weeks are perfected in form and in power. Moreover, that form and that power are both for uses which, so far as the creature's previous "experience" is concerned, are absolutely new.

With such "leaps" as this in the Creative Work going on in every field, and stream, and sea around us, we may have the utmost confidence that the same Work has involved the same principles through all time. From the beginning of it there has been no chance—none of its results have been attained by accident—none in Physics by the mere clash of Atoms—none in Vitality by the mere "struggle for existence." Existence has come before struggle, and not after it. There never has been "experience" till the faculties by which it is acquired have been first given and then set to work. There never has been any "use" till the Organs have been formed by which service could be rendered. Creation and Evolution, therefore, when these terms have been cleared from intellectual confusion, are not antagonistic conceptions mutually exclusive. They are harmonious and complementary. In this aspect both conceptions are equally, thoroughly, and in-

tensely anthropopsychic—both absolutely demanding as a condition of the facts being rendered intelligible that Utility should be recognised as an end before it can possibly have been made use of as a means. Under whatever cloud of words men may endeavour to conceal it, our recognition of this universal fact and law in the genesis of Organic Functions is the recognition of Mind by Mind,—the recognition by the human mind of operations which are intelligible to it only because they are operations having a close analogy with its own.

CHAPTER VIII.

Man as the Representative of the Supernatural.

THE denial and exclusion of what is called "The Supernatural" in our explanations of Nature, is the same doctrine in another form as the denial and exclusion of Anthropopsychism. The connection may not be evident at first sight, but it arises from the fact that the human Mind is really the type, and the only type, of that which men call the Supernatural. It would be well if this word were altogether banished from our vocabulary. It is in the highest degree ambiguous and deceptive. It assumes that the system of "Nature" in which we live and of which we form a part, is limited to purely physical agencies linked together by nothing but mechanical necessity. There might indeed be no harm in this limitation of the word Nature if it could possibly be adhered to. But it is not possible to adhere to it, and that for the best of all reasons,

because even inanimate Nature, as we habitually see it, and are obliged to speak of it, is not a System which gives us the idea of being governed and guided by mechanical necessity. No wonder men find it difficult to believe in the Supernatural, if by the Supernatural they mean any Agency which is nowhere present in the visible and intelligible Universe, or is not implicitly represented and continually reflected there. For indeed in this sense no Christian can believe in the Supernatural,—in a Creation from which the Creator has been banished, or has withdrawn Himself. On the other hand, if by the Supernatural we mean an Agency which, while ever present in the material and intelligible Universe, is not confined to it, but transcends it, then indeed the difficulty is not in the believing of it, but in the disbelieving of it. No man can really hold that the Material System which is visible or intelligible to us is anything more than a fragment or a part. No man can believe that its existing arrangements of Matter and of Force are self-caused, self-originated, and self-sustained. It is not possible, therefore, so to "crib, cabin, and confine" our conceptions of Nature as to exclude elements which essentially belong to what is called the Supernatural. And there is another reason why it is impossible to adhere to such conceptions of the Natural, and that is, that it would compel us to exclude the Mind of

Man, and indeed the lesser minds of all living things, from our scientific definition of Nature, and to establish an absolute and rigorous separation between all of these and the world in which they move and act. We have seen not only how impracticable such a separation is, but how false it is to the facts of science. The same condemnation must fall on every conception of the Universe which assumes this separation as not only important but fundamental. Yet this is the very separation on which those philosophers absolutely depend who condemn what they call the Supernatural in our conceptions and explanations of the world. And in the interest of their own argument they are quite right in keeping to this separation as indispensable for their purpose. In order to exclude from Nature what they call the Supernatural, it is absolutely necessary that they should in the first place exclude Man. If Nature be nothing but Matter, Force, and Mechanical Necessity, then Man belongs to the Supernatural, and is indeed the very embodiment and representation of it.

Accordingly this identification of Man with the Supernatural is necessarily and almost unconsciously involved in language which is intended to be strictly philosophical, and in the most careful utterances of our most distinguished scientific men. Thus Professor Tyndall, in his Belfast Address to the British

Association, uses these words: "Our earliest historic ancestors fell back also upon experience, but with this difference, that the particular experiences which furnished the weft and woof of their theories were drawn, not from the study of Nature, but from what lay much closer to them—the observation of men." Here Man is especially contradistinguished from Nature; and accordingly we find in the next sentence that this idea is connected with a condemnation of the error of seeing ourselves—that is, the Supernatural in Nature. "Their theories," the Professor goes on to say, "accordingly took an anthropomorphic form." Further on, in the same Address, the same antithesis is still more distinctly expressed, thus: "If Mr. Darwin rejects the notion of creative power acting after human fashion, it certainly is not because he is unacquainted with the numberless exquisite adaptations on which the notion of a supernatural artificer is founded." Here we see that the idea of "acting after human fashion" is treated as synonymous with the idea of a "supernatural artificer;" and the same identification may be observed running throughout the language which is commonly employed to condemn what is sometimes called Anthropomorphism and at other times is called the Supernatural.

The two propositions, therefore, which are really involved in the thoroughgoing denial of Anthropo-

psychism and the Supernatural are the following: 1st, that there is nothing except Man which is above or outside of mere Matter and Force in Nature as we see and know it; 2nd, that in the System of Nature as thus seen and known, there are no phenomena due to Mind having any analogies with our own.

Surely these propositions have been refuted the moment the definition of them has been attained. We have only to observe, in the first place, the strange and anomalous position in which it places Man. As regards at least the higher faculties of his mind, he is allowed no place in Nature, and no fellowship with any other thing or any other Being outside of Nature. He is absolutely alone—out of all relation with the Universe around him, and under a complete delusion when he sees in any part of it any mental homologies with his own Intelligence, or with his own Will, or with his own Affections. Does this absolute solitariness of position as regards the higher attributes of Man—does it sound reasonable, or possible, or consistent with some of the most fundamental conceptions of science? How, for example, does it accord with that great conception whose truth and sweep become every day more apparent—the Unity of Nature?

How can it be true that Man is so outside of

that Unity that the very notion of seeing anything like himself in it is the greatest of all philosophical heresies? Does not the very possibility of science consist in the possibility of reducing all natural phenomena to purely natural conceptions, which must be related to the Intellect of Man when they are worked out and apprehended by it? And if, according to the latest theories, Man is himself a Product of Evolution, and is, therefore, in every atom of his Body and in every function of his Mind a part and a child of Nature, is it not in the highest degree illogical so to separate him from it as to condemn him for seeing in it some image of himself? If he is its product and its child, is it not certain that he is right when he sees and feels the indissoluble bonds of unity which unite him to the great System of things in which he lives?

This fundamental inconsistency in the Agnostic philosophy becomes all the more remarkable when we find that the very men who tell us that we are not One with anything above us, are the same who insist that we are One with everything beneath us. Whatever there is in us or about us which is purely animal we may see everywhere; but whatever there is in us purely intellectual and moral, we delude ourselves if we think we see it anywhere. There are abundant homologies between our bodies and the bodies of the beasts,

but there are no homologies between our minds and any Mind which lives and manifests itself in Nature. Our livers and our lungs, our vertebræ and our nervous systems, are identical in origin and in function with those of the living creatures round us; but there is nothing in Nature or above it which corresponds to our Forethought, or Design, or Purpose—to our love of the Good or our admiration of the Beautiful—to our indignation with the wicked, or to our pity for the suffering and the fallen. I venture to think that no system of philosophy that has ever been taught on Earth lies under such a weight of antecedent improbability; and this improbability increases in direct proportion to the success of science in tracing the Unity of Nature, and in showing step by step how its laws and their results can be brought more and more into direct relation with the Mind and Intellect of Man.

Let us test this philosophy from another point of view, and see how far it is consistent with our advancing knowledge of those combinations of natural Force by which the system of the physical Universe appears to be sustained.

We may often see in the writings of our physical teachers in the present day reference made to a celebrated phrase of the old and abandoned school of Aristotelian physics—a phrase invented

by that old school to express a familiar fact—that it is extremely difficult, if not absolutely impossible, to produce a perfect vacuum—that is to say, a space which shall be absolutely empty. The phrase was this: "Nature abhors a vacuum." It is now continually held up as a perfect example and type of the old habit of thought which vitiates all true physical reasoning. Now let us observe what this error is. As a forcible and picturesque way of expressing a physical truth — that the difficulty of producing a vacuum is extreme, that Nature sets, as it were, her face against our doing it—the phrase is a good one, and conveys an excellent idea of the general fact. Sir W. Grove says of it, that it is "an aphorism, which, though cavilled at and ridiculed by the self-sufficiency of some modern philosophers, contains in a terse though somewhat metaphorical form the expression of a comprehensive truth." But there is this error in the phrase (if indeed it was or ever could be literally understood)—that it gives for the general fact a wrong cause, inasmuch as it ascribes to the material and inanimate Forces of Nature, whose simple pressures are concerned in the result, certain dispositions that are known to us as affections of Mind alone. In short, it ascribes to the mere elementary Forces of Matter —not to a living Agency using these as tools,

but to mere Material Force—the attributes of Mind.

Now it is well worthy of remark that, so far as this error is concerned, the language of physical science is full of it—steeped in it; and that in this sense it is chargeable with a kind of Anthropomorphism which is really open to the gravest objection. To see Mind in Nature, or, according as Nature may be defined, to see Mind outside of Nature, acknowledging it to be Mind, and treating it as such—this is one thing—and this is the true and legitimate Anthropopsychism which some physicists denounce. But to see Mind in Material Forces alone, and to ascribe its attributes to them—this is equally Anthropomorphism, but a form of it which is indeed open to all the objections they express. This, nevertheless, is the Anthropomorphism which gives habitually its colouring to their thoughts and its spirit to their language.

Let me explain what I mean by some examples. I will take, first, the theory of Development, or the derivative hypothesis, which, as applied to the history of Organic Life, is now accepted by a large number of scientific men, if not as certainly true, at least as an hypothesis which comes nearer than any other to the truth. Whether that theory be true or not, it is a theory saturated throughout with the ideas of utility and fitness, and of adap-

tation, as the governing principles and causes of the harmony of Nature. Its central conception is, that in the history of Organic Life changes have somehow always come about exactly in proportior as the need of them arose. But how is it that the laws of growth are so correlated with utility that they should in this manner work together? Why should varied and increasing utility operate in the requisite direction of varied and increasing developments? The connection is not one of logical necessity. Not only can we conceive it otherwise, but we know that it is otherwise beyond certain bounds and limits. It is not an universal law that organic growths arise in proportion to all needs, or are strengthened by all exertion. It is a law prevailing only within certain limits; and it is not possible to describe the facts concerning it without employing the language which is expressive of mental purpose.

Accordingly, I have pointed out in a former work * that Mr. Darwin himself does use this language perpetually, and to an extent far exceeding that in which it is used by almost any other natural philosopher. Some writers who see in his theory nothing but its materialistic aspects have taken alarm at this language, and have warned him of its dangerous significance. But he never—to the last—accepted a warning that would have hindered

* "Reign of Law," Chap. I.

him in that faithful interpretation of Nature which consisted in simply expressing what he saw. Accordingly in none of his works has this teleological tendency of language been more marked as an inevitable necessity of thought than in one of his very latest contributions to science. "The Movements of Plants" have been traced by him through hours, and days, and months of the most patient and accurate observation. It is found as a fundamental fact that the growth of all plants is effected along lines of movement which may be described as spiral or screwing, and to this fundamental fact the term "Circumnutation" has been applied. Now the physical cause of this movement is at least obscure, but, on the other hand, the purposes which it subserves are not obscure at all. All that can be said about the physical cause is, that "it probably arises from changes in the turgescence of the cells" * taking place alternately upon opposite sides of the growing part. But this is little more than a re-statement of the fact in another form of words. The increased turgescence of the cells on one side means or involves increased growth on that side. The other side remaining comparatively still, necessarily exerts a pull upon the moving side, as an anchor exerts a pull upon the swinging of a ship. This pull turns or twists the moving side towards

* Page 663.

itself, and thus a constant twisting or spiral motion is established in all growing vegetation.

But how comes it that the turgescence of cell-growth should be unequal and alternate? It is no physical explanation of circumnutation merely to state its essential condition as a fact. Mr. Darwin calls the changes in turgescence "spontaneous" —that is to say, they are innate and their causes are unknown. But now, when we come to the uses of circumnutation, we find them to be clear, definite, and almost infinitely various. By means of it the roots of plants seek the ground,—pierce the soil, —twist themselves away from obstacles, and run in the direction of moisture or of nourishment. By the same means the upward shoots from germs which are buried underground curl themselves into an arch, so that with greater strength and with greater mechanical advantage they can burst through the substance and the hardened surface of the soil. By the same twisting movements they can face the Sun, or they can close their petals against cold and storm—they can lay their leaves in a direction least exposed to frosts and blights —they can sleep and they can wake—they can avoid objects that hinder them from the light—they can seek the shade from excessive glare—they can rear their heads alone, or they can clasp and entwine themselves round necessary supports.

Every one who has observed even cursorily the growth of plants must have seen cases in which they seem not only to have the senses of a living animal, but to have powers of self-adjustment and of structural self-adaptation which no animal possesses. It is common, for example, to see a tree which has been planted on the edge of a steep bank throw out roots of extraordinary size and strength upon the side which needs special support. The same versatility of powers is visible in a thousand other cases. Mr. Darwin has traced it through an immense variety of applications, and in describing it he sees, and he expresses in vivid language, the mental attributes of Purpose which it embodies. He speaks of the roots of plants "thus following with unerring skill a line of least resistance." He speaks of a "curious special contrivance for bursting the seed-coats whilst beneath the ground—namely, a peg at the base of the hypocotyl projecting at right angles which holds down the lower half of the seed-coats, whilst the growth of the arched part of the hypocotyl lifts up the upper half and thus splits them in twain."* He speaks of circumnutating movements "being so arranged that the blade stands vertically during the night, reassuming its former position on the following morning."† He even speaks of the tip of a root "perceiving the air to be moister on

* "Movements of Plants," p. 556. † Ibid., p. 561.

one side than on the other, and transmitting an influence to the adjoining part which leads towards the source of moisture." * Finally he says that "in almost every case (in plant life) we can clearly perceive the final purpose or advantage of the several movements."

Mr. Darwin does not use this language with any theological purpose nor in connection with any metaphysical speculation. He uses it simply and naturally for no other reason than that he cannot help it. The Correlation of Natural Forces so adjusted as to work together for the production of use in the functions, for the enjoyments, and for the beauty of Life—this is the central idea of his system; and it is an idea which cannot be worked out in detail without habitual use of the language which is moulded on our own consciousness of the mental powers by which all our own adjustments are achieved. This is what, perhaps, the greatest Observer that has ever lived cannot help observing in Nature; and so his language is thoroughly anthropopsychic. Seeing in the methods pursued in Nature a constant embodiment of his own intellectual conceptions, and a close analogy with the methods which his own mind recognises as "contrivance," he rightly uses the forms of expression which convey the work of Mind.

* "Movements of Plants," p. 572.

"Rightly," I say, provided the full scope and meaning of this language be not repudiated. I do not mean that naturalists should be always following up their language to theological conclusions, or that any fault should be found with them when they stop where the sphere of mere physical observation terminates. But those who seek to remodel philosophy upon the results of that observation cannot consistently borrow all the advantage of anthropopsychic language, and then denounce it when it carries them beyond the point at which they desire to stop. If in the words which we recognise as best describing the facts of Nature there be elements of meaning to which their whole force and descriptive power is due, then these elements of meaning must be admitted as essential to a just conception and to a true interpretation of what we see. The analogies which help us to understand the works of Nature are not, as it were, foreign material imported into the facts, but are part of these facts, and constitute the light which shines from them upon the Intellect of Man. In exact proportion as we believe that Intellect to be a product of Nature, and to be united to it by indissoluble ties of birth, of Structure, and of Function, in the same proportion may we be sure that its Organs of vision are adjusted to the realities of the world, and that its innate perceptions of analogy

and resemblance have a close relation to the truth. The theory of Development is not only consistent with teleological explanation, but it is founded on teleology, and on nothing else. It sees in everything the results of a System which is ever acting for the best, always producing something more perfect or more beautiful than before, and incessantly eliminating whatever is faulty or less perfectly adapted to every new condition. Professor Tyndall himself cannot describe this System without using the most intensely anthropopsychic language: "The continued effort of animated nature is to improve its conditions and raise itself to a loftier level."*

Again I say, it is quite right to use this language, provided its ultimate reference to Mind be admitted and not repudiated. But if this language be persistently applied and philosophically defended as applicable to material Force, otherwise than as the instrument and tool of Mind, then it is language involving far more than the absurdity of the old mediæval phrase that "Nature abhors a vacuum." It ceases to be a mere picturesque expression, and becomes a definite ascription to Matter of the highest attributes of Mind. If Nature cannot feel "abhorrence," neither can it cherish "aspirations." If it cannot hate, neither can it love, nor contrive,

* Belfast Address.

nor adjust, nor look to the future, nor think about "loftier levels" there.

Professor Tyndall in the same Address has given us an interesting anecdote of a very celebrated man whom the world has lately lost. He tells us that he heard the great Swiss naturalist Agassiz express an almost sad surprise that the Darwinian theory should have been so extensively accepted by the best intellects of our time. And this surprise seems again in some measure to have surprised Professor Tyndall. Now it so happens that I have perhaps the means of explaining the real difficulty felt by Agassiz in accepting the modern theory of Evolution. I had not seen that distinguished man for nearly five-and-thirty years. But he was one of those gifted Beings who stamp an indelible impression on the memory; and in 1842 he had left an enthusiastic letter on my father's table at Inveraray on finding it largely occupied by scientific works. Across that long interval of time I ventured lately to seek a renewal of acquaintance, and during the year which proved to be the last of his life, I asked him some questions on his own views on the history and origin of Organic Forms. In his reply Agassiz sums up in the following words his objection to the theory of Natural Selection as affording any satisfying explanation of the facts for which it professes to account:—"The truth is, that

Life has all the wealth of endowment of the most comprehensive mental manifestations, and none of the simplicity of physical phenomena."

Here we have the testimony of another among the very greatest of modern Observers that wealth —immense and immeasurable wealth—of Mind is the one fact above all others observable in Nature, and especially in the adaptations of Organic Life. It was because he could see no adequate place or room reserved for this fact in the theory of Development that Agassiz rejected it as not satisfying the conditions of the problem to be solved. Probably this may be the fault of the forms in which it has been propounded, and of the strenuous endeavours of many of its supporters to shut out all interpretations of a higher kind. But of this we may be sure, that if men should indeed ultimately become convinced that species have been all born just as individuals are now all born, and that such has been the universal method of Creation, this conviction will not only be found to be soluble, so to speak, in the old beliefs respecting a creative Mind, but it will be unintelligible and inconceivable without them, so that men in describing the history and aim and direction of Evolution, will be compelled to use substantially the same language in which they have hitherto spoken of the history of Creation.

Mr. Mivart has indeed remarked in a very able work,* as Mr. Wallace had remarked before him, that the teleological language used so freely by Mr. Darwin and others is purely metaphorical. As I have already elsewhere† dealt with this criticism, I need only repeat here, what cannot be insisted upon too firmly, that even if it were strictly accurate, it had no adverse bearing upon the evidence which this language of so-called metaphor involves. It is not strictly accurate because there is no real element of metaphor except where the outward forms of the human Personality are ascribed to Nature. Nature has no hands and no brain; but these members, even in Man, are regarded as "Organs," and as nothing else—the visible representatives of invisible powers: and where the names of these organs, and of such like, are not figuratively used in respect to Nature,—where nothing is expressed but the facts of teleological adaptation, there is not, properly speaking, any metaphor at all. But putting this aside for the moment, and granting that in the description of the invisible phenomena of Mind it is difficult to avoid all reference to the outward and visible forms in which these phenomena are manifested in us—even so, this metaphorical element does not affect the evidence supplied by the inevitable phraseology of all natural philosophers

* "Genesis of Species." † "Reign of Law," Chap. I.

when it is their business to describe what they see in Nature. For what purpose are metaphors used? Is it not as a means of making plain to our own understandings the principle of things, and of tracing amid the varieties of phenomena the essential Unities of Nature? In this sense all Language is full of metaphor, being indeed composed of little else. That is to say, the whole structure and architecture of Language consists of words which transfer and apply to one sphere of investigation ideas which have been derived from another, because there also the same ideas are seen to be expressed, only under some difference of form. Accordingly, when naturalists, describing plants or animals, use the language of Contrivance to describe the Adaptations of Function, they must use it because they feel it to be a help in the understanding of the facts. When, for example, we are told that flowers are constructed in a peculiar manner "in order that" they may catch the probosces of Moths or the backs of Bees, and that this adaptation again is necessary "in order that" these insects should carry the fertilising pollen from flower to flower, nothing more may be immediately intended by the writer than that all this elaborate mechanism does as a matter of fact attain this end, and that it may be fitly described "as if" it had been arranged "in order

that" these things might happen. But this use of language is none the less an acknowledgment of the truth that the facts of Nature are best brought home and explained to the Understanding, and to the Intelligence of Man, by stating them in terms of the relation which they obviously bear to the familiar operations of our own Mind and Spirit.

And this is the invariable result of all physical inquiry. In this sense Nature is essentially anthropopsychic. Man sees his own Mind everywhere reflected in it—his own, not in quantity but in quality—his own fundamental attributes of Intellect, and, to a wonderful and mysterious degree, even his own methods of operation.

It is really curious and instructive to observe how even those who struggle hardest to avoid the language of Anthropopsychism in the interpretations of Nature are compelled to make use of the analogies of our own mental operations as the only possible exponents of what we see. Let us look, for example, at the definition of Life given by Mr. Herbert Spencer. It is a very old endeavour to construct such definitions, and not a very profitable one: inasmuch as Life is only known to us as itself, and all attempts to reduce it to other conceptions are never anything but mere playing with empty words. But it is not without instruction to observe

that Mr. Spencer's laborious analysis comes to this: "Life is the continuous Adjustment of internal relations to external relations." Bare, abstract, and evasive of the most characteristic facts as this formula is, it does contain at least one definite idea as to how Life comes to be. Life is an "Adjustment." This is a purely anthropopsychic conception, conveying the idea of that kind of co-ordination between different powers or elements which is the result of constructive Purpose. I have already pointed out in a former chapter that all combinations are not Adjustments. The whole force and meaning of the word consists in its reference to intentional arrangement. No combination can properly be called an Adjustment if it be purely accidental. When, therefore, Life is represented as an Adjustment, this is the mental image which is reproduced; and in so far as it does reproduce this idea, and does consciously express it, the formula has at least some intelligible meaning. If, indeed, it has any plausibility or approach to truth at all, this is the element in it from which this plausibility is derived.

We may take another case. Mr. Matthew Arnold, a writer of great distinction both as a critic and as a poet, has invented a new phrase for that conception of a Divine Being which alone, as the ultimate residuum of thought, can be justified by such evidence as we possess. And what is that phrase?

"The Eternal, not ourselves, which makes for Righteousness." It is evident that whatever meaning there may be in this artificial and cumbrous phrase is entirely derived from its Anthropopsychism. An Agency which "makes for" something —that something, too, being in the future, and being also in itself an abstract moral and intellectual conception—what can such an agency be conceived to be? "Making for" an object of any kind is a purely human image—an image, too, derived primarily not from the highest efforts of human Will, but from those which are represented in the exercises of the Body, and the skill with which, in athletic contentions, some distant goal may be reached and won. Such is the attempt of a very eminent man to instruct us how we are to think of God without seeing in Him or in His world anything analogous to our own thought and work.

Nor is it wonderful that this attempt should fail, when we consider what it is an attempt to do—to establish an absolute separation between Man and Nature; to set up Man as something above Nature, and outside of it; and yet to affirm that there is no other Being, and no other Intelligence, in a like position. And if anything can render this attempt more unreasonable, it must be the further attempt to reach this result through science,

—science, the very possibility of which depends on, and consists in, the possibility of reducing all natural phenomena within the terms of human thought, so that its highest generalisations are always the most abstract intellectual conceptions. Science is the systematic knowledge of relations; but that which perceives relations must be itself related. All explanation consists in nothing else than in establishing the relation which some order of external facts bears to some corresponding order of Perception and of Thought; and it follows from this truth, that the highest explanations of phenomena must always be those which establish such relations with the highest faculties of our nature. Professor Tyndall, in another part of his Belfast Address, like many other writers of the present day, goes the length of saying that the great test of physical truth is what may be called its "representability,"—that is to say, the degree in which a given physical conception can, from the analogies of experience, be represented in thought. But if our power of picturing a physical fact distinctly be indeed an indication of a true physical analogy, how much more distinctly than any physical fact can we picture the characteristic workings of our own mental constitution? Yet these are the conceptions which, we are told, we are not to cherish, because they are anthropomorphic—or, in other

words, because of the very fact that they are so familiar to us, and that their mental representability is so complete.

Some, indeed, of our physical teachers, conscious of this necessary and involuntary Anthropopsychism of human thought and speech, struggle hard to expel it by inventing phrases which shall as far as possible avoid it. But it is well worthy of observation, that in exact proportion as these phrases do avoid it, they become incompetent to describe fully the facts of science. For example, let us take again those incipient changes in the substance of an egg by which the Organs of the future animal are successively laid down—changes which have all reference to a purely purposive adaptation of that substance to the future discharge of separate and special functions. I have already referred * to the fact that these changes are now commonly described as "differentiations," an abstract expression which simply means the establishment of differences, without any reference to the peculiar nature of those differences, or their relations to each other and to the whole. But the inadequacy of this word to express the facts is surely obvious. The processes of dissolution and decay are processes of "differentiation" quite as much as the process of growth and adaptation to living functions. Blood

* Chap. I. p. 29.

is "differentiated" just as much when, upon being spilt upon the ground, it separates into fibrin, serum, and corpuscles, or finally into its inorganic elements, as when, circulating in the vessels, it bathes and feeds the various tissues of the living Body. But these two operations—these two kinds of "differentiation"—are not only distinct, but absolutely opposite in their nature, and there does not seem to be much light in that philosophy which insists on using the same formula of expression to describe them both. It is a phrase which empties the facts, as we can see and know them, of all that is special in our knowledge of them.

There is another conspicuous example of the same misuse of language which is common in connection with phenomena of the very highest interest and importance in the science of Physiology. I refer to the regular formula of words which is almost always employed to designate and define the automatic actions of the animal frame. The set phrase for this class of movement is "Reflex Action." Now this phrase is not only wholly incompetent from weakness and insufficiency to convey any adequate conception of the facts as they exist in Nature, but worse than this—it involves conceptions and suggests analogies which are altogether misleading and erroneous. "Reflex" etymologically means of course "turned back" or

"bent back." And this is the sense in which it is properly and accurately applied to such phenomena, for example, as the reflection of Light or of Radiant Heat. In these cases the Radiant Energy impinges upon some surface, and is turned or bent back from it so as to take a new path in a different direction. But the essential idea in all such cases is that in both paths—the path of incidence, and the new path of reflection—the original Energy is the same in kind. The light which strikes the surface of the Sea is nothing but light when it glances off the liquid surface and appears as a vivid gleam upon the horizon. Some portions indeed of a beam may be lost or absorbed in the process of reflection, but no new element is added. It comes to the reflecting surface as ethereal undulations, and it leaves it again as ethereal undulations, and as nothing else.

Now, there is no analogy whatever between this kind of movement or of action and the highly complex movements which result automatically in the living frame of animals from the stimulation of some external nerve. It is quite true that some movement goes inward to the brain, or to some subordinate nervous centre, and that some movement comes back from that centre in return. But the movement which goes is not the same movement which returns. The two movements are not only far from being identical, but they are not even the

same in kind. We might as well describe it as "reflex action" when some great fleet weighs anchor and puts out to sea in response to a signal from the flagship; or when gunners enveloped in a cloud of smoke aim their artillery by directions from the top. These are no random similes. They are perhaps the closest analogies which could be chosen to illustrate the wonders which are performed by the animal Organism under some simple stimulus applied to the termination of a nerve. In itself that stimulus may be said to be a signal and nothing more. The reading of it involves the interpretation of a Code, and the obeying of the signal by responsive action involves the simultaneous and the co-ordinated action of a host of living structures. In all such cases the action which begins is not the same kind of action as that which follows. The initial movement is one which is uniform and simple, having no other office than to rouse, and to suggest or order. The resulting movements are multiform and complex, with all the functions of interpretation and of obedience. There is nothing whatever here corresponding to the mere bendings and repetitions of physical reflection.

If there be any purely and merely physical relation between the tremors of a nerve and the complicated movements which arise in answer, it is a relation not of identity or even of likeness, but a

relation, on the contrary, of such essential difference as to correspond better with the idea of some total transmutation. But even this is a feeble image, inasmuch as it retains a trace of the idea of some underlying and substantial sameness. But the facts of Nature demand imperatively that we should admit into our conception of the results which are concealed under the words Reflex Action, certain elements other than those of mere mechanical motion, however changed in direction or transmuted in form. In observing the effects, and in reading accounts of the effects, of what is called "Reflex Action" in the animal economy, and before I had submitted the phrase to strict analysis, I had long felt that sense of confusion which results from the presentation to the Mind of false analogies, of incompetent description, and of formulæ of expression which, pretending to be scientific, are in reality nothing but the wilful shutting-out of knowledge. It is, however, most satisfactory to find that in one of the latest and best text-books of Physiology, that of Professor Forster of Cambridge, there is a full confession of the incompetency of such words as "Reflex Action" to describe the relation between the stimulus of an "afferent" nerve and the "efferent" movements which are carried into responsive pre-adjusted action. The two classes of impulse and of resulting movement are justly described as really "incom-

mensurate." And whilst the purely mechanical or physical relation of mere bending or turning is thus condemned not only as an inadequate, but as essentially a false image of the real relation which subsists between the antecedent and the consequent phenomena, that real relation is described and admitted in the following remarkable passage :—" In the more complex reflex actions of the brainless frog and in other cases, the relation is of such a kind as that the resulting movement bears *an adaptation* to the stimulus ; the foot is withdrawn from the stimulus, or the movement is calculated to push or wipe away the stimulus. In other words, a certain purpose is evident in the reflex action." *

Here we have the formula of expression which is almost universally employed by Physiologists to describe some of the most important phenomena of their science, authoritatively detected and exposed ; whilst the mental element of pre-adjustment and adaptation, which such phrases are invented to avoid and to conceal, is brought out as the most prominent and characteristic feature in the scientific appreciation and description of facts.

It is possible, no doubt, by artifices of language similar to that which has been here exposed, to deprive the facts of Nature—or at least appear to deprive them—of their highest significance. More

* "Text-Book of Physiology," Chap. III. p. 117.

foolish than the fabled Ostrich, we may try to shut our eyes against our own perceptions, or we may refuse to register them in our language—resorting, for the sake of evasion, to some juggleries of speech. "Potential existence" is another of those vague abstract conceptions which may be, and is, employed for a like purpose. It may be applied indiscriminately to a mere slumbering force, or to an unfulfilled intention, or to an undeveloped mental faculty, or to an elaborate preparation of foresight and design. If we desire to take refuge from the necessity of forming any distinct conceptions, such phrases are eminently convenient for the purpose, whilst under cover of them we may cheat ourselves into the belief that we have got hold of some definite idea, and perhaps even of an important truth.

All who are puzzled and perplexed by the prevalent teaching on these high matters should subject the language in which it is conveyed to a careful, systematic, and close analysis. It will be found to fall within one or other of these three classes :—First, there is the phraseology of those who, without any thought either of theological dogma or of philosophical speculation, are, above all things, observers, and who describe the facts they see in whatever language appears most fully and most naturally to convey what they see to

others. The language of such men is what Mr. Darwin's language almost always is — eminently teleological and anthropopsychic. Next, there is the language of those who purposely shut out this element of thought, and condemn it as unscientific. The language of this class is full of the vague abstract phrases to which I have referred— "differentiation"—"molecular change"—"harmony with environment," and others of a like kind— phrases which, in exact proportion to their abstract character, are evasive, and fall short of describing what is really seen. Lastly, we have the language of those who habitually ascribe to Matter the properties of Mind; using this language not metaphorically, like the old Aristotelians whom they despise, but literally—declaring that Mind, as we know it, must be considered as having been contained "potentially" in Matter, and was once nothing but a cosmic vapour or a fiery cloud. Well may Professor Tyndall call upon us "radically to change our notions of Matter," if this be a true view of it; for in this view it becomes equivalent to "Nature" in that largest and widest interpretation to which I referred at the close of the last chapter — viz., that in which Nature is understood as the whole System of things in which we live, and of which we form a part. But if this philosophy be true, let us at least

cease to condemn, as the type of all absurdity, the old mediæval explanations of material phenomena, which ascribe to them affections of the Mind. If Matter be so widened in meaning as to be the mother and source of Mind, it must surely be right and safe enough to see in material things those dispositions and activities which are said to be nothing but its product in ourselves.

The truth is, that this conception of Matter and of Nature, which is associated with vehement denunciations of Anthropomorphism, is itself founded on nothing else but Anthropomorphism pushed to its very farthest limit. It is entirely derived from and founded on the fact that Mind, as we see it in ourselves, is in this world inseparably connected with a material Organism, and on the further assumption that Mind is inconceivable or cannot be inferred except in the same connection. This would be a very unsafe conclusion even if the connection between our Bodies and our Minds were of such a nature that we could not conceive the separation of the two. But so far is this from being the case, that, as Professor Tyndall most truly says, "it is a connection which we know only as an inexplicable fact, and we try to soar in a vacuum when we seek to comprehend it." The universal testimony of human Speech—that sure record of the deepest metaphysical truths

—proves that we cannot but think of the Body and the Mind as separate—of the Mind as our proper selves, and of the Body as indeed external to it. Let us never forget that Life, as we know it here below, is the antecedent or the cause of Organisation, and not its product; that the peculiar combinations of Matter which are the homes and abodes of Life are prepared and shaped under the control and guidance of that mysterious Power which we know as Vitality; and that no discovery of science has ever been able to reduce it to a lower level, or to identify it with any Purely material Force. And, lastly, we must remember that even if it be true that Life and Mind have some inseparable connection with the Forces which are known to us as material, this would not make the supreme agencies in Nature, or Nature as a whole, less anthropopsychic, but greatly more; so that it would, if possible, be even more unreasonable than it is now to condemn Man when he sees in Nature a Mind having real analogies with his own.

And now what is the result of this argument—what is its scope and bearing? Truly it is a very wide scope indeed—nothing less than this: that nothing in Philosophy, in Theology, in Belief, can be reasonably rejected or condemned on the sole ground that it is anthropopsychic. That is to say,

no adverse presumption can arise against any Conception, or any Idea, or any Doctrine on the mere ground that it rests on the analogies of Human Thought. This is a position—purely negative and defensive though it be—from which we cannot be dislodged, and which holds under its destructive fire a thousand different avenues of attack.

But this is not all. Another result of the same argument is to establish a presumption the other way. All the analogies of Human Thought are in themselves analogies of Nature, and in proportion as they are built up or are perceived by Mind in its higher attributes and work, they are part and parcel of natural truth. Man—he whom the Greeks call Anthropos, because, as it has been supposed, he is the only Being whose look is upwards—Man is a part of Nature, and no artificial definitions can separate him from it. And yet in another sense it is true that Man is above Nature — outside of it; and in this aspect he is the very type and image of the "Supernatural." The instinct which sees this image in him is a true instinct, and the consequent desire of atheistic philosophy to banish Anthropopsychism from our conceptions is dictated by an obvious logical necessity. But in this necessity the system is self-condemned. Every advance of science is a new testimony

to the supremacy of Mind, and to the correspondence between the Mind of Man and the Mind which is supreme in Nature. Nor yet will it be possible, in the face of science, to revive that Nature-worship which breathes in so many of the old Religions of Mankind. For in exalting Mind, science is ever making plainer and plainer the inferior position of the purely physical aspects of Nature—the subordinate character of what we know as Matter and material Force. Has not science, for example, even in these last few years, rendered for ever impossible one of the oldest and most natural of the Idolatries of the world? It has disclosed to us the physical constitution of the Sun—that great heavenly body which is one of the chief proximate causes of all that we see and enjoy on Earth, and which has seemed most naturally the very image of the Godhead to millions of the human race. We now know the Sun to be simply a very large globe of solid and of gaseous matter, in a state of fierce and flaming incandescence. No man can worship a ball of fire, however big; nor can he feel grateful to it, nor love it, nor adore it, even though its beams be to him the very light of life. Neither in it, nor in the mere Physical Forces of which it is the centre, can we see anything approaching to the rank and dignity of even the humblest

human heart. "What know we greater than the Soul?" It is only when we come to think of the co-ordination and adjustment of these physical Forces as part of the mechanism of the heavens —it is only, in short, when we recognise the mental—that is, the anthropopsychic—element, that the Universe becomes glorious and intelligible, as indeed a Cosmos; a System of Order and Beauty adapted to the various ends which we see actually attained, and to a thousand others which we can only guess. No philosophy can be true which allows that we see in Nature the most intimate relations with our intellectual conceptions of Space and Time and Force and Numerical Proportion, but denies that we can ever see any similar relation with our conceptions of Purpose and Design, or with those still higher conceptions which are embodied in our sense of Justice and in our love of Righteousness, and in our admiration of the "quality of Mercy." These elements in the Mind of Man are not less certain than others to have some correlative in the Mind which rules in Nature. Assuredly, in the supreme Government of the Universe these are not less likely than other parts of our mental constitution to have some part of the natural System related to them—so related that the knowledge of that System shall be at once their interpretation and fulfilment. Neither brute Matter nor inanimate

Force can supply either the one or the other. If there be one truth more certain than another, one conclusion more securely founded than another, not on Reason only, but on every other Faculty of our nature, it is this—that there is nothing but Mind that we can respect; nothing but Heart that we can love; nothing but a perfect combination of the two that we can adore.

And yet it cannot be denied that among the many difficulties and the many mysteries by which we are surrounded, perhaps the greatest of all difficulties and the deepest of all mysteries concerns the limits within which we can, and beyond which we cannot, suppose that we bear the image of Him who is the source of Life. It seems as if, on either side, our thoughts are in danger of doing some affront to the Majesty of Heaven—on the one hand, if we suppose the Creator to have made us with an intense desire to know Him, but yet destitute of any faculties capable of forming even the faintest conception of His nature; on the other hand, if we suppose that creatures such as (only too well) we know ourselves to be, can image the High and the Holy One who inhabiteth Eternity. Both these aspects of the truth are vividly represented in the language of the great Prophets of Humanity who "at sundry times and in divers manners" have spoken most powerfully to the world upon Divine

things. On the one hand we have such strong but simple images as those which represent the Almighty as "walking in the garden in the cool of the day," or as speaking to the Jewish lawgiver "face to face, as a man speaketh with his friend;" on the other hand we have the solemn and emphatic declaration of St. John that "no man hath seen God at any time." In the sublime poetry of Job we have at once the most touching and almost despairing complaints of the inaccessibility and inscrutability of God, and also the most absolute confidence in such a knowledge of His character as to support and justify unbounded trust. In the Psalms we have these words addressed to the wicked as conveying the most severe of all rebukes, "Thou thoughtest that I was altogether such an one as thyself."

And perhaps this word "altogether" indicates better than any other the true reconciliation of apparent contradictions. In the far higher light which Christianity claims to have thrown on the relations of Man to God, the same solution is in clearer terms presented to us. "Knowing in part and prophesying in part," "Seeing through a glass darkly," and many other forms of expression, imply at once the reality and yet the partial character of the truths which on these high matters our faculties enable us to attain. And this idea is not

only consistent, but is inseparably connected with that Sense of Limitation which we have already seen to be one of the most remarkable and significant facts connected with our mental constitution. There is not one of the higher powers of our mind in respect of which we do not feel that we are tied and bound by the weight of our infirmities. Therefore we can have no difficulty in conceiving all our own powers exalted to an indefinite degree. And thus it is that although all Goodness, and Power, and Knowledge must, in respect to quality, be conceived of as we know them in ourselves, it does not follow that they can only be conceived of according to the measure which we ourselves supply.

These considerations show — first, that as the human Mind is the highest created thing of which we have any knowledge, its conceptions of what is greatest in the highest degree must be founded on what it knows to be the greatest and highest in itself; and, secondly, that we have no difficulty in understanding how this image of the Highest may, and must be, faint—without being at all unreal or untrue.

There are, moreover, as we have seen, some remarkable features connected with our consciousness of limitation pointing to the conclusion that we have faculties enabling us to recognise certain truths when they are presented to us, which we

could never have discovered for ourselves. The sense of mystery which is sometimes so oppressive to us, and which is never more oppressive than when we try to fathom and understand some of the commonest questions affecting our own life and nature, suggests and confirms this representation of the facts. For this sense of oppression can only arise from some Organs of mental vision watching for a light which they have been formed to see, but from which our own investigations cannot lift the veil. If that veil is to be lifted at all, the evidence is that it must be lifted for us. Physical science does not even tend to solve any one of the ultimate questions which it concerns us most to know, and which it interests us most to ask. It is according to the analogy and course of Nature that to these questions there should be some answering voice, and that it should tell us things such as we are able in some measure to understand. Nor ought it to be a thing incredible to us—or even difficult to believe—that the system disclosed should be in a sense anthropopsychic—that is to say, that it should bear some very near relation to our own forms of thought—to our own faculties of Mind, and Soul, and Spirit. For all we do know, and all the processes of thought by which knowledge is acquired, involve and imply the truth that our Mind is indeed made in some real sense

in the image of the Creator, although intellectually its powers are very limited, and morally its condition is very low.

In this last element of consciousness, however—not the limitation of our intellectual powers, but the unworthiness of our moral character—we come upon a fact differing from any other which we have hitherto considered. It is not so easy to assign to it any consistent place in the Unities of Nature. What it is and what it appears to indicate, must form the subject of another chapter.

CHAPTER IX.

On the Moral Character of Man.

THE Consciousness of Unworthiness in respect to moral character is a fact as fundamental and as universal in the human mind as the Consciousness of Limitation in respect to intellectual power. Both of them may exist in a form so rudimentary as to be hardly recognisable. The limits of our Intelligence may be felt only in a dim sense of unsatisfied curiosity. The faultiness of our character may be recognised only in the vaguest emotions of occasional self-reproach. But as the knowledge of Mankind extends, and as the cultivation of their moral faculties improves, both these great elements of consciousness become more and more prominent, and occupy a larger and larger place in the horizon of their thoughts. It is always the men who know most who feel

most how limited their knowledge is. And so likewise it is always the loftiest spirits who are most conscious of the infirmities which beset them.

But although these two great facts in human consciousness are parallel facts, there is a profound difference between them; and to the nature and bearing of this difference very careful attention must be paid.

We have seen in regard to all living things what the relation is between the physical powers which they possess and the ability which they have to use them. It is a relation of close and perfect correspondence. Everything requisite to be done for the unfolding and upholding of their life they have impulses universally disposing them to do, and faculties fully enabling them to accomplish. We have seen that in the case of some animals this correspondence is already perfect from the infancy of the creature, and that even in the case of those which are born comparatively helpless, there is always given to them just so much of impulse and of power as is requisite for the attainment of their own maturity. It may be nothing more than the mere impulse and power of opening the mouth for food, as in the case of the chicks of many Birds; or it may be the much more active impulse and the much more complicated power by which the young Mammalia

seek and secure their nourishment; or it may be such wonderful special instincts as that by which the newly hatched Cuckoo, although blind and otherwise helpless, is yet enabled to expel its rivals from the nest, and thus secure that undivided supply of food without which it could not survive. But whatever the impulse or the power may be, it is always just enough for the work which is to be done. We have seen, too, that the amount of prevision which is involved in those instinctive dispositions and actions of animals is often greatest in those which are low in the scale of life, so that the results for which they work, and which they do actually attain, must be completely out of sight to them. In the wonderful metamorphoses of Insect Life, the imperfect creature is guided with certainty to the choice and enjoyment of the conditions which are necessary to its own development; and when the time comes it selects the position, and constructs a cell in which its own mysterious transformations are accomplished.

All this is in conformity with an absolute and universal Law in virtue of which there is established a perfect unity between these three things:—first, the physical powers and structure of all living creatures; secondly, those dispositions and instinctive appetites which are seated in that structure

to impel and guide its powers; and thirdly, the external conditions in which the creature's life is passed, and in which its faculties find an appropriate field of exercise.

If Man has any place in the Unity of Nature, this law must prevail with him. There must be the same correspondence between his powers and the instincts which incite and direct him in their use. Accordingly it is in this law that we find the explanation and the meaning of his Sense of Ignorance. For without a sense of ignorance there could be no desire of knowledge, and without his desire of knowledge Man would not be Man. His whole place in Nature depends upon it. His curiosity, and his wonder, and his admiration, and his awe—these are all but the adjuncts and subsidiary allies of that supreme affection which incites him to inquire and know. Nor is this desire capable of being resolved into his tendency to seek for an increased command over the comforts and conveniences of life. It is wholly independent of that kind of value which consists in the physical utility of things. The application of knowledge comes after the acquisition of it, and is not the only, or even the most powerful, inducement to its pursuit. The real incitement is an innate appetite of the Mind—conscious in various degrees of the mystery, and of the beauty, and of the majesty of the System in

which it lives and moves; conscious, too, that its own relations to that System are but dimly seen and very imperfectly understood. In a former chapter we have seen that this appetite of knowledge is never satisfied, even by the highest and most successful exertion of those faculties which are, nevertheless, our only instruments of research. We have seen, too, what is the meaning and significance of that great Reserve of Power which must exist within us, seeing that it remains unexhausted and inexhaustible by the proudest successes of discovery. In this sense it is literally true that the eye is not satisfied with seeing, nor the ear filled with hearing. Every new advance has its new horizon. Every answered question brings into view another question unanswered, and perhaps unanswerable, lying close behind it. And so we come to see that this Sense of Ignorance is not only part of our nature, but one of its highest parts—necessary to its development, and indicative of those unknown and indefinite prospects of attainment which are at once the glory and the burden of Humanity.

It is impossible to mistake, then, the place which is occupied among the Unities of Nature by that Sense of Ignorance which is universal among men. It belongs to the number of those primary mental conditions which impel all living things to do that

which it is their special work to do, and in the doing of which the highest law of their Being is fulfilled. In the case of the lower animals, this law, as to the part they have to play and the ends they have to serve in the economy of the world, is simple, definite, and always perfectly attained. No advance is with them possible, no capacity of improvement, no dormant or undeveloped powers leading up to wider and wider spheres of action. With Man, on the contrary, the law of his Being is a law which demands progress, which endows him with faculties enabling him to make it, and fills him with aspirations which cause him to desire it. Among the lowest Savages there is some curiosity and some sense of wonder, else even the rude inventions they have achieved would never have been made, and their degraded superstitions would not have kept their hold. Man's Sense of Ignorance is one of the greatest of his gifts, for it is the secret of his wish to know. The whole structure and the whole furniture of his Mind is adapted to this condition. The highest law of his Being is to advance in wisdom and knowledge: and his sense of the Presence and of the Power of things which he can only partially understand, is an abiding witness of this law, and an abiding incentive to its fulfilment.

In all these aspects there is an absolute contrast between our Sense of Limitation in respect to intel-

lectual power (or knowledge) and our Sense of Unworthiness in respect to moral character. It is not of ignorance, but of knowledge, that we are conscious here,—even the knowledge of the distinction between Good and Evil, and of that special Sense which in our nature is associated with it, namely, the Sense of moral Obligation. Now it is a universal fact of consciousness as regards ourselves, and of observation in regard to others, that, knowing evil to be evil, men are nevertheless prone to do it, and that, having this sense of moral Obligation, they are nevertheless prone to disobey it. This fact is entirely independent of the particular standard by which men in different stages of society have judged certain things to be good and other things to be evil. It is entirely independent of the infinite variety of rules according to which they recognise the doing of particular acts, and the abstention from other acts, to be obligatory upon them. Under every variety of circumstance in regard to these rules, under every diversity of Custom, of Law, or of Religion by which they are established, the general fact remains the same—that what men themselves recognise as duty they continually disobey, and what according to their own standard they acknowledge to be wrong they continually do.

There is unquestionably much difficulty in finding any place for this fact among the Unities of Nature.

It falls therefore in the way of this inquiry to investigate how this difficulty arises, and wherein it consists.

And here we at once encounter those old fundamental questions on the nature, the origin, and the authority of the Moral Sense which have exercised the human mind for more than two thousand years; and on which an eminent writer of our own time has said that no sensible progress has been made. This result may well suggest that the direction which inquiry has taken is a direction in which progress is impossible. If men will try to analyse something which is incapable of analysis, a perpetual consciousness of abortive effort will be their only and their inevitable reward.

For just as in the physical world there are bodies or substances which are (to us) elementary, so in the spiritual world there are perceptions, feelings, or emotions, which are equally elementary—that is to say, which resist all attempts to resolve them into a combination of other and simpler affections of the mind. And of this kind is the idea, or the conception, or the sentiment of Obligation. That which we mean when we say, "I ought," is a meaning which is incapable of reduction. It is a meaning which enters as an element into many other conceptions, and into the import of many other forms of expression, but it is itself uncompounded. All

attempts to explain it do one or other of these two things—either they assume and include the idea of Obligation in the very circumlocutions by which they profess to explain its origin; or else they build up a structure which, when completed, remains as destitute of the idea of Obligation as the separate materials of which it is composed. In the one case, they first put in the gold, and then they think that by some alchemy they have made it; in the other case, they do not indeed first put in the gold, but neither in the end do they ever get it. No combination of other things will give the idea of Obligation, unless with and among these things there is some concealed or unconscious admission of itself. But in this, as in other cases with which we have already dealt, the ambiguities of language afford an easy means or an abundant source of self-deception. One common phrase is enough to serve the purpose —the "Association of Ideas." Under this vague and indefinite form of words all mental operations and all mental affections may be classed. Consequently those which are elementary may be included, without being expressly named. This is one way of putting in the gold and then of pretending to find it as a result. Take one of the simplest cases in which the idea of Obligation arises, even in the rudest minds—namely, the case of gratitude to those who have done us good. Beyond all

question, this simple form of the Sense of Obligation is one which involves the association of many ideas. It involves the idea of Self as a moral agent and the recipient of good. It involves the idea of other human beings as likewise moral agents, and as related to us by a common nature, as well as, perhaps, by still more special ties. It involves the idea of things good for them, and of our having power to confer these things upon them. All these ideas are "associated" in the sense of gratitude towards those who have conferred upon us any kind of favour. But the mere word "association" throws no light whatever upon the nature of the connection. "Association" means nothing but grouping or contiguity of any kind. It may be the grouping of mere accident—the associations of things which happen to lie together, but which have no other likeness, relation, or connection. But this, obviously, is not the kind of association which connects together the different ideas which are involved in the conception of gratitude to those who have done us good. What then is the associating tie? What is the link which binds them together, and constitutes the particular kind or principle of association? It is the Sense of Obligation. The associating or grouping power lies in this Sense. It is the centre round which the other perceptions aggregate. It is the seat of that

force which holds them together, which keeps them in a definite and fixed relation, and gives its mental character to the combination as a whole.

If we examine closely the language of those who have attempted to analyse the Moral Sense, or, in other words, the Sense of Obligation, we shall always detect the same fallacy—namely, the use of words so vague that under cover of them the idea of Obligation is assumed as the explanation of itself. Sometimes this fallacy is so transparent in the very forms of expression which are used, that we wonder how men of even ordinary intelligence, far more men of the highest intellectual power, can have failed to see and feel the confusion of their thoughts. Thus, for example, we find Mr. Grote expressing himself as follows:—"This idea of the judgment of others upon our conduct and feeling as agents, or the idea of our own judgment as spectators in concurrence with others upon our own conduct as agents, is the main basis of what is properly called Ethical sentiment."* In this passage the word "judgment" can only mean moral judgment, which is an exercise of the Moral Sense; and this exercise is gravely represented as the "basis" of itself.

Two things, however, ought to be carefully considered and remembered in respect to this ele-

*"Fragments on Ethical Subjects, pp."9, 10.

mentary character of the Moral Sense. The first is, that we must clearly define to ourselves what the idea is of which, and of which alone, we can affirm that it is elementary; and secondly, that we must define to ourselves as clearly, if it be possible to do so, in what sense it is that any Faculty whatever of the Mind can really be contemplated as separable from, or as uncombined with, others.

As regards the first of these two things to be defined, namely, the idea which we affirm to be simple or elementary, it must be clearly understood that this elementary character, this incapability of being reduced by analysis, belongs to the bare sense or feeling of Obligation, and not at all, or not generally, to the processes of thought by which that feeling may be guided in its exercise. This distinction is immense and obvious. The Sense of right and of wrong is one thing; the way in which we come to attach the idea of right or wrong to the doing of certain acts, or to the abstention from certain other acts, is another and a very different thing. This is a distinction which applies equally to many other simple or elementary affections of the Mind. The liking or disliking of certain tastes or affections of the palate is universal and elementary. But the particular tastes which are the objects of liking or of aversion are for the most part determined by habits and

education. There may be tastes which all men are so constituted as necessarily to feel disgusting; and in like manner there may be certain acts which all men everywhere must feel to be contrary to their Sense of Obligation. Indeed we shall see good reason to believe that this not only may be so, but must be so. But this is a separate subject of inquiry. The distinction in principle is manifest between the Sense itself and the laws by which its particular applications are determined.

The second of the two things to be defined—namely, the sense in which any Faculty whatever of the Mind can really be regarded singly, or as uncombined with others—is a matter so important that we must stop to consider it with greater care.

The analogy is not complete, but only partial, between the analysis of Mind and the analysis of Matter. In the analysis of Matter we reach elements which can be wholly separated from each other, so that each of them can exist and can be handled by itself. In the analysis of Mind we are dealing with one Organic Whole; and the operation by which we break it up into separate faculties or powers is an operation purely ideal, since there is not one of these faculties which can exist alone, or which can exert its special functions without the help of others. When we speak, therefore, of a

Moral Sense or of Conscience, we do not speak of it as a separate entity any more than when we speak of Reason or of Imagination. Strictly speaking, no Faculty of the Mind is elementary in the same sense in which the elements of Matter are (supposed to be) absolutely simple or uncombined. Perhaps there is no Faculty of the Mind which presents itself so distinctly and is so easily separable from others as the Faculty of Memory. And yet Memory cannot always reproduce its treasures without an effort of the Will, nor, sometimes, without many artificial expedients of Reason to help it in retracing the old familiar lines. Neither is there any Faculty more absolutely necessary than Memory to the working of every other. Without Memory there could not be any Reason, nor any Reflection, nor any Conscience. In this respect all the higher Faculties of the human Mind are much more inseparably blended and united in their operation than those lower Faculties which are connected with bodily sensation. These lower Faculties are indeed also parts of one Whole, are connected with a common centre, and can all be paralysed when that centre is affected. But in their ordinary activities their spheres of action seem widely different, and each of them can be, and often is, seen in apparently solitary and independent action. Sight and taste and touch and hearing are all very different from each other—so separate

indeed that the language of the one can hardly be translated into the language of the other.

But when from these lower Faculties, which are connected with separate and visible Organs of the Body, and which we possess in common with the Brutes, we ascend to the great central group of higher and more spiritual Faculties which are peculiar to Man, we soon find that their unity is more absolute, and their interdependence more visibly complete. Ideally we can distinguish them, and we can range them in an ascending order. We can separate between different elements and different processes of thought, and in accordance with these distinctions we can assign to each of them a separate Faculty of the Mind. We think of these separate Faculties as being each specially apprehensive of one kind of idea, or specially conducting one kind of operation. Thus the reasoning Faculty works out the process of logical sequence, and apprehends one truth as the necessary consequence of another. Thus the Faculty of Reflection passes in review the previous apprehensions of the Intellect, or the fleeting suggestions of Memory and of Desire, looks at them in different aspects, and submits them now to the tests of reasoning, and now to the appreciations of the Moral Sense. Thus, again, the supreme Faculty of Will determines the subject of investigation, or the direction of thought,

or the course of conduct. But although all these Faculties may be, and indeed must sometimes be, conceived and regarded as separate, they all more or less involve each other; and in the great hierarchy of powers, the highest and noblest seem always to be built upon the foundations of those which stand below. Memory is the indispensable servant of them all. Reflection is ever turning the Mind inward on itself. The logical Faculty is ever rushing to its own conclusions as necessary consequences of the elementary axioms from which it starts, and which are to it the objects of direct and intuitive apprehension. The Moral Sense is ever passing its judgments upon the conduct of others and of ourselves; whilst the Will is ever present to set each and all to their proper work. And the proper work of every Faculty is to see some special kind of relation or some special quality in things which other Faculties have not been formed to see. But although these qualities in things are in themselves separate and distinct, it does not at all follow that the separate Organs of the Mind, by which they are severally apprehended, can ever work without each other's help. The sense of logical necessity is clearly different from the sense of moral Obligation. But yet as Reason cannot work without the help of Memory, so neither can the Moral Sense work without the help of Reason. And the

elements which Reason has to work on in presenting different actions to the judgment of the Moral Sense, may be, and often are, of very great variety. It is these elements, many and various in their character, and contributed through the help and concurrence of many different Faculties of the Mind, that men are really distinguishing and dissecting when they think they are analysing the Moral Sense itself. What they do analyse with more or less success is not the Moral Sense, but the conditions under which that Sense comes to attach its special judgments of approval or of condemnation to particular acts or to particular motives.

And this analysis of the conditions under which the Moral Sense performs its work, although it is not the kind of analysis which it often pretends to be, is nevertheless in the highest degree important, for although the Sense of Obligation, or, as it is usually called, the Moral Sense, may be in itself simple, elementary, and incapable of reduction, it is quite possible to reach conclusions of the most vital interest concerning its nature and its functions by examining the circumstances which do actually determine its exercise, especially those circumstances which are necessary and universal facts in the experience of Mankind.

There is, in the first place, one question respecting the Moral Sense which meets us at the thres-

hold of every inquiry respecting it, and to which a clear and definite answer can be given. This question is—What is the subject-matter of the Moral Sense? or, in other words, what is the kind of thing of which alone it takes any cognisance, and in which alone it recognises the qualities of right and wrong?

To this fundamental question one answer, and one answer only, can be given. The things, and the only things, of which the Moral Sense takes cognisance are the actions of Man. It can take no cognisance of the actions of machines, nor of the actions of the inanimate Forces of Nature, nor of the actions of Beasts, except in so far as a few of these may be supposed to possess in a low and elementary degree some of the characteristic powers of Man. Human conduct is the only subject-matter in respect of which the perceptions of the Moral Sense arise. They are perceptions of the Mind which have no relation to anything whatever except to the activities of another Mind constituted like itself. For, as no moral judgment can be formed, and no moral perception can be felt, except by a moral agent, so neither can it be formed in respect to the conduct of any other agent which has not, or is not assumed to have, a nature like our own—moral, rational, and free.

And this last condition—freedom—which is an

essential one to the very idea of an Agency having any moral character, will carry us a long way on towards a farther definition of the subject-matter on which the Moral Sense is exercised. It is, as we have seen, human conduct. But it is not human conduct in its mere outward manifestations, for the only moral element in human conduct is its actuating motive. If any human action is determined not by any motive whatever, but simply by external or physical compulsion, then no moral element is present at all, and no perception of the Moral Sense can arise respecting it. Freedom, therefore, in the sense of exemption from such compulsion, must be assumed as a condition of human action absolutely essential to its possessing any moral character whatever. There can be no moral character in any action, so far as the individual actor is concerned, apart from the meaning and intention of the actor. The very same deed may be good, or, on the contrary, devilishly bad, according to the inspiring motive of him who does it. The giving of a cup of cold water to assuage suffering, and the giving it to prolong life in order that greater suffering may be endured, are the same outward deeds, but are exactly opposite in moral character. In like manner, the killing of a man in battle, and the killing of a man for robbery or revenge, are the same actions, but the one may be often right, whilst the other

must be always wrong, because of the different motives which incite the deed.

Illustrations of the same general truth might be given as infinite in variety as the varying circumstances and conditions of human conduct. It is a truth perfectly consistent with the doctrine of an Independent Morality. Every action of a voluntary agent has, and must have, its own moral character, and yet this character may be separate and apart from its relation to the responsibility of the individual man who does it. That is to say, every act must be either permitted, or forbidden, or enjoined, by legitimate Authority, although the man who does it may be ignorant of the Authority or of its commands. And the same proposition holds good if we look upon the ultimate standard of morality from the Utilitarian point of view. Every act must have its own relation to the future. Every act must be either innocent, or beneficent, or hurtful in its ultimate tendencies and results. Or, if we like to put it in another form, every act must be according to the harmony of Nature or at variance with that harmony, and therefore an element of disorder and disturbance. In all these senses, therefore, we speak, and we are right in speaking, of actions as in themselves good or bad, because we so speak of them according to our own knowledge of the relation in which they stand to those great axioms

of morality, which are facts, and not mere assumptions or even mere beliefs. But we are quite able to separate this judgment of the act from the judgment which can justly be applied to the individual agent. As regards him, the act is right or wrong, not according to our knowledge, but according to his own. And this great distinction is universally recognised in the language and (however unconsciously) in the thoughts of men. It is sanctioned, moreover, by Supreme Authority. The most solemn prayer ever uttered upon Earth was a prayer for the forgiveness of an act of the most enormous wickedness, and the ground of the petition was specially declared to be that those who committed it "knew not what they did." The same principle which avails to diminish blame, avails also to diminish or to extinguish merit. We may justly say of many actions that they are good in themselves, assuming, as we naturally do, that those who do such actions do them under the influence of the appropriate motive. But if this assumption fails in any particular case, we cannot and we do not credit the actor with the goodness of his deed. If he has done a thing which in itself is good in order to compass an evil end, then, so far as he is concerned, the deed is not good, but bad. It may indeed be worse in moral character than many other kinds of evil deeds, and this just because of the goodness usually attaching to it. For

this goodness may very probably involve the double guilt of some special treachery, or some special hypocrisy; and both treachery and hypocrisy are in the highest degree immoral. It is clear that no action, however apparently benevolent, if done from some selfish or cruel motive, can be a good or a moral action.

It may seem, however, as if the converse of this proposition cannot be laid down as broadly and as decidedly. There are deeds of cruelty in abundance which have been done, ostensibly at least, and sometimes, perhaps, really, from motives comparatively good, and yet from which an enlightened Moral Sense can never detach the character of wickedness and wrong. These may seem to be cases in which the motive does not determine the moral character of the action, and in which our Moral Sense persists in condemning the thing done in spite of the motive. But if we examine closely the grounds on which we pass judgment in such cases, we shall not, I think, find them exceptions to the rule or law that the purpose or intention of a free and voluntary agent is the only thing in which any moral goodness can exist, or to which any moral judgment can be applied. In the first place, we may justly think that the actors in such deeds are to a large extent themselves responsible for the failure in knowledge, and for the defective Moral

Sense which blind them to the evil of their conduct, and which lead them to a wrong application of some motive which may in itself be good. And in the second place, we may have a just misgiving as to the singleness and purity of the alleged purpose which is good. We know that the motives of men are so various and so mixed, that they are not always themselves conscious of that motive which really prevails, and we may have often good reasons for our convictions that bad motives unavowed have really determined conduct for which good motives only have been alleged. Thus, in the case of religious persecution, we may be sure that the lust of power, and the passion of resentment against those who resist its ungovernable desires, have very often been the impelling motive, where nothing but the love of truth has been acknowledged. And this at least may be said, that in the universal judgment of Mankind, actions which they regard as wrong have not the whole of that wrongfulness charged against the doers of them, in proportion as we really believe the agents to have been guided purely and honestly by their own sense of Moral Obligation.

On the whole, then, we can determine or define with great clearness and precision the field within which the Moral Sense can alone find the possibilities of exercise,—and that field is the conduct of

men;—by which is meant not their actions only, but the purpose, motive, or intention by which the doing of these actions is determined. This conclusion, resting on the firm ground of observation and experience, is truthfully expressed in the well-known lines of Burns:—

> "The heart's aye the part aye
> Which makes us right or wrang."

And now it is possible to approach more closely to the great central question of all ethical inquiry:—Are there any motives which all men under all circumstances recognise as good? Are there any other motives which, on the contrary, all men under all circumstances recognise as evil? Are there any fundamental perceptions of the Moral Sense upon which the standard of right and wrong is planted at the first, and round which it gathers to itself, by the help of every Faculty through which the Mind can work, higher and higher conceptions of the course of duty?

In dealing with this question, it is a comfort to remember that we are in possession of analogies deeply seated in the constitution and in the course of Nature. It is quite possible to assign to Intuition or to Instinct the place and rank which really belongs to it, and to assign also to what is called Experience the functions which are unquestionably its own. There is no Sense or Faculty of the Mind

which does not gain by education—not one which is independent of those processes of development which result from its contact with the external world. But neither is there any Sense or Faculty of the Mind which starts unfurnished with some one or more of those intuitive perceptions with which all education and all development must begin. Just as every exercise of Reason must be founded on certain axioms which are self-evident to the logical Faculty, so all other exercises of the Mind must start from the direct perception of some rudimentary truths. It would be strange indeed if the moral Faculty were any exception to this fundamental law. This Faculty in its higher conditions, such as we see it in the best men in the most highly civilised communities, may stand at an incalculable distance from its earliest and simplest condition, and still more from its lowest condition, such as we see it in the most degraded races of Mankind. But this distance has been reached from some starting-point, and at that starting-point there must have been some simple acts or dispositions to which the sense of Obligation was instinctively attached. And beyond all question this is the fact. All men do instinctively know what gives pleasure to themselves, and therefore also what gives pleasure to other men. Moreover, to a very large extent, the things which give

them pleasure are the real needs of life, and the acquisition or enjoyment of these is not only useful but essential to the well-being or even to the very existence of the race. And as Man is a social animal by nature, with social instincts at least as innate as those of the Ant or the Beaver or the Bee, we may be sure that there were and are born with him all those intuitive perceptions and desires which are necessary to the growth and unfolding of his powers.

And this we know to be the fact, not only as a doctrine founded on the unities of Nature, but as a matter of universal observation and experience. We know that without the Moral Sense Man could not fulfil the part which belongs to him in the world. It is as necessary in the earliest stages of the Family and of the Tribe, as it is in the latest developments of the State and of the Church. It is an element without which nothing can be done—without which no man could trust another, and, indeed, no man could trust himself. There is no bond of union among men—even the lowest and the worst—which does not involve and depend upon the Sense of Obligation. There is no kind of brotherhood or association for any purpose which could stand without it. As a matter of fact, therefore, and not at all as a matter of speculation, we know that the Moral Sense holds a high place as one of the necessary conditions in the develop-

ment of Man's nature, in the improvement of his condition, and in the attainment of that place which may yet lie before him in the future of the world.

There are other sentiments and desires which, being as needful, are equally instinctive. Thus, the desire of communicating pleasure to others is one of the instincts which is as universal in Man as the desire of communicating knowledge. Both are indeed branches of the same stem—offshoots from the same root. The acquisition of knowledge, to which we are stimulated by the instinctive affections of curiosity and of wonder, is one of the greatest of human pleasures, and the desire we have to communicate our knowledge to others is the great motive-force on which its progress and accumulation depend. The pleasure which all men take, when their dispositions are good, in sharing with others their own enjoyments, is another feature quite as marked and quite as innate in the character of Man. And if there is any course of action to which we do instinctively attach the sentiment of moral approbation, it is that course of action which assumes that our own desires, and our own estimates of good, are the standard by which we ought to judge of what is due to, and is desired by others. The social instincts of our nature must, therefore, naturally and intuitively indicate benevolence as a virtuous, and malevolence as a vicious disposition;

and, again, our knowledge of what is benevolent and of what is malevolent is involved in our own instinctive sense of what to us is good, and of what to us is evil. It is quite true that this sense may be comparatively low or high, and consequently that the standard of obligation which is founded upon it may be elementary and nothing more. Those whose own desires are few and rude, and those whose estimates of good are very limited, must of course form an estimate correspondingly poor and scant of what is good for, and of what is desired by, others. But this exactly corresponds with the facts of human nature. This is precisely the variety in unity which its phenomena present. There are no men of sane mind in whom the Moral Sense does not exist; that is to say, there are no men who do not attach to some actions or other the sentiment of approval, and to some other actions the opposite sentiment of condemnation. On the other hand, the selection of the particular actions to which these different sentiments are severally attached is a selection immensely various; there being, however, this one common element in all,—that the course of action to which men do by instinct attach the feeling of moral Obligation, is that course of action which is animated by the feeling that their own desires and their own estimate of good is the standard by which they must judge of what is

due by them to others, and by others to themselves.

And here we stand at the common point of departure from which diverge the two great antagonistic schools of Ethical Philosophy. On the one hand, in the intuitive and elementary character which we have assigned to the sentiment of Obligation, considered in itself, we have the fundamental position of that school which asserts an independent basis of morality; whilst, on the other hand, in the elementary truths which we have assigned to the Moral Sense as its self-evident apprehensions, we have a rule which corresponds, in one aspect at least, to the fundamental conception of the Utilitarian school. For the rule which connects the idea of Obligation with conduct tending to the good of others, as tested by our own estimate of what is good for ourselves, is a rule which clearly brings the basis of morality into very close connection with the practical results of conduct. Accordingly, one of the ablest modern advocates of the Utilitarian system has delared that "in the golden rule of Jesus of Nazareth we read the complete spirit of the ethics of Utility. To do as you would be done by, and to love your neighbour as yourself, constitute the ideal perfection of Utilitarian morals." *

* J. S. Mill, "Utilitarianism," pp. 24, 25.

This may well seem a strange and almost a paradoxical result to those who have been accustomed to consider the Utilitarian theory not so much a low standard of morals, as an idea which is devoid altogether of that element in which the very essence of morality consists. But it is a result due to these two causes—first, that under the fire of controversy, Utilitarians have been obliged to import into the meaning of their words much that does not really belong to them; and secondly, to the fact, that when this essential alteration has been made, then the theory, or rather the portion of it which remains, does represent one very important aspect of a very complex truth.

It will be well to examine a little more closely the different ways in which these two causes operate.

In the first place, as regards the ambiguities of language, a moment's consideration will convince us that the word "utility" has, in its proper and primary signification, nothing whatever of the ethical meaning which is attached to it in the Utilitarian theory of morals. In its elementary signification the useful is simply the serviceable. It is curious to observe that this last word has no ethical savour about it. On the contrary, it is associated rather with the lower than with the higher uses of conduct. If this be objected to as preventing the

two words from being really the equivalent of each other, then at least let it be recognised that utility must be divested of its ethical associations before it can be set up as an ethical test. If utility is first assumed to be the equivalent of goodness, it becomes of course a mere play on words to represent usefulness as the criterion of virtue. If we are to conduct our analysis correctly, we must expel from utility every adventitious element of meaning. The usefulness of a thing means nothing more than its conduciveness to some purpose. But it may be any purpose,—morally good, or morally bad, or morally indifferent. The boot-jack, the thumb-screw, and the rack are all useful machines for the purpose of producing torture on the victim, and for the purpose, too, of giving to the torturers that pleasure or satisfaction which wicked men find in tyranny or revenge. The words "good" and "bad" are themselves often used in a secondary and derivative sense, which, like "useful," may be destitute of any ethical meaning. A good thumb-screw would mean an implement well adapted to produce the most exquisite pain. A good torture may mean a torture well calculated to gratify the savage sentiment of revenge. In like manner, although not to the same extent, the words "right" and "wrong" are often used with no ethical element of meaning. The right

way for a man who wishes to commit suicide would be the way to a precipice over which he desires to throw himself. But the same way is the wrong way for him, if he wishes to avoid the danger of falling. In this way we may speak of the right way of doing the most wicked things.

One most eminent expounder of the Utilitarian theory has taken advantage of this common use of the words "good" and "bad," and of "right" and "wrong," to represent utility and inutility to be the essential idea of all goodness and of all badness respectively.* Thus the unavoidable ambiguities of speech are employed to give a scientific aspect to the confounding and obliteration of the profoundest distinctions which exist in knowledge. By the double process of expelling from Goodness the idea of virtue, and of inserting into Utility the idea of beneficence, the fallacies of language become complete. Because subserviency to purpose of any kind is the meaning of "good," when applied equally to an instrument of torture and to an instrument for the relief of suffering, therefore, it is argued, the same meaning must be the essential one when we speak of a good man. And so indeed it may be, if we know or assume beforehand what the highest purpose is to which Man can be made subservient. There is a well-known

* Herbert Spencer, "Data of Ethics," chap. iii.

Catechism of one of the Reformed Churches which opens with the question, "What is the chief end of Man?" The answer is perhaps one of the noblest in the whole compass of Theology. "Man's chief end is to glorify God and to enjoy Him for ever."* Given certain further beliefs as to the character of the Divine Being, and the methods of His government, then indeed it would be true that this is a conception of the purpose of Man's existence which would erect mere serviceableness or utility into a perfect rule of conduct. Perhaps even a lower or less perfect conception of the great aim of Man's life would be almost enough. If virtue and beneficence are first assumed to be the highest purpose of his Being, then subserviency to that purpose may be all that is meant by goodness. But, without this assumption as to the "chief end of Man," there would be no ethical meaning whatever in the phrase of "a good man." It might mean a good thief, or a good torturer, or a good murderer. Utility, that is to say, mere subserviency to any purpose, is undoubtedly a good in itself, and of this kind is the goodness of a machine which is invented for a bad or evil purpose. But this utility in the machine is, so far as the machine is concerned, destitute of any moral character whatever, and, so

* "The Shorter Catechism, presented by the Westminster Assembly of Divines to both Houses of Parliament, and by them approved."

far as those who employ it are concerned, the utility is not virtuous, but, on the contrary, it is vicious. It is clear, therefore, that when the word "Utility" is used as meaning moral or even physical good, and still more when it is identified with virtue, or when it is declared to be the standard of that which is right or virtuous in conduct, the word is used not in its own proper sense, but in a special or adventitious sense, in which it is confined to one special kind of usefulness, namely, that which conduces to good ends, and good aims, and good purposes. That is to say, the sense in which utility is spoken of as the test or standard of virtue is a sense which assumes that goodness and virtue are independently known, or in other words, that they are determined and recognised by some other test and some other standard.

It is, however, clear that when by this other test and standard, whatever it may be, we have already felt or apprehended that it is right and virtuous to do good to others, then the usefulness of any action or of any course of conduct, in the production of such good, does become a real test and indication of that which we ought to do. It is a test or indication of the particular things which it is right to do, but not at all a test of the moral Obligation which lies upon us to do them. This Obligation must be assumed, and is assumed, in every argument on the

moral Utility of things. It is by confounding these two very distinct ideas that the Utilitarian theory of the ultimate basis of moral Obligation has so long maintained a precarious existence, borrowing from the misuse of words a strength which is not its own. But the moment this distinction is clearly apprehended, then, although we set aside the bare idea of usefulness, apart from the good or bad purpose towards which that usefulness conduces, as affording any explanation whatever of the ultimate nature and source of duty, we may well, nevertheless, be ready to adopt all that the Utilitarian theory can show us of that inseparable unity which is established in the constitution of the world between the moral character, and the ultimate results, of conduct. As far as these results can be traced beforehand, and in proportion as they can be traced farther and farther in the light of expanding knowledge, they do indicate the path of duty. They do indicate the line of action which is obligatory on voluntary agents, to whom a very large amount of power is given in directing the course of things. Beyond all doubt there are a thousand acts and a thousand courses of conduct which are in accordance with the Moral Sense, because and only because of the known happiness of their effects. This is the fact, or rather the class of facts, which has in all ages recommended the Utilitarian theory of morals to so

many powerful minds. For, indeed, if we understand by utility, not the low or limited idea of mere usefulness for any purpose—not even the mere idea of pleasure as an unquestionable good of its own kind, nor the mere idea of immediate profit or advantage—but the very different conception of the beneficence of ultimate results on the welfare of all men and of all creatures, then there may be, and probably there is, an universal and absolute coincidence between the things which it is wise, and the things which it is right, to do.

Men may imagine, and they have imagined, that under this conception of Utility they can devise a system of morality which is of such transcendental excellence that it is far too good for Earth. Thus it has been laid down that Evolution, in its most perfect conception, would be such that the development of every creature would be compatible with the equal development of every other. In such a system it is said there would be no "struggle for existence—no harmful competition, no mutual devouring—no death."* The inspired imaginings of the Jewish Prophets of some future time when the Lion shall lie down with the Lamb, and the ideas which have clustered round the Christian Heaven, are more probably the real origin of this conception than any theory of Evolution founded on the facts and laws of Nature. But,

* Herbert Spencer, "Data of Ethics," chap. ii. pp. 18, 19.

for all practical purposes, such a system of Ethics is as useless as the dreams of Plato's Republic or of More's Utopia. If, however, we have got from some independent source a right idea of that which will be most beneficent in its ultimate results, we may well be guided by this light in so far as we can see it. But inasmuch as these far-off results and tendencies of conduct cannot always be within sight, and are indeed very often wholly beyond the horizon visible to us, this admission, or rather this high doctrine that the Right and the Useful are always coincident, is a widely different doctrine from that which identifies the sense of Obligation with the perception of Utility. The mere perception that any act or course of conduct will certainly be beneficent in its results, would be of no avail without the separate feeling that it is right to strive for results which are beneficent.

And here it is well worthy of observation, that in direct proportion to the height and sublimity of the meaning artificially attached to the word "utility," it becomes less and less available as a test or as a rule of conduct. So long as the simple and natural meaning was put upon utility, and the good was identified with the pleasurable, or the serviceable, the Utilitarian theory of morals did indicate at least some rule of life, however low that rule might be. But now that the apostles of that theory have been driven to put upon utility a transcendental meaning, and the

pleasurable is interpreted to refer not merely to the immediate and visible effects of conduct on ourselves or others, but to its remotest effects upon all living Beings, both now and for all future time, the Utilitarian theory in this very process of sublimation becomes lifted out of the sphere of human judgment. If it be true "that there can be no correct idea of a part without a correct idea of the correlative whole," and if human conduct in its tendencies and effects is only "a part of universal conduct,"*—that is to say, of the whole System of the Universe in its past, its present, and its future—then, as this whole is beyond all our means of knowledge and comprehension, it follows that utility, in this sense, can be no guide to us. If indeed this System of the Universe has over it, or in it, one Supreme Authority, and if we knew on that Authority the things which do make, not only for our own everlasting peace, but for the perfect accomplishment of the highest purposes of Creation to all living things, then indeed the Rule of Utility is resolved into the simple Rule of Obedience to legitimate Authority. And this logical result is consistent with all we know of the Unity of Nature, and with all that we can conceive of the central and ultimate Authority on which its Order rests. All intuitive perceptions come to us from that Authority. All instincts which are the result of Organization

* Herbert Spencer, "Data of Ethics," chap. i. pp. 1–6.

come to us from that Authority. All the data of Reason come to us from that Authority. All these in their own several spheres of operation may well guide us to what is right, and may well give us, too, the conviction that what is right is also what is best, "at last, far off, at last to all."

Thus far a clear and consistent answer can be given to one of the greatest questions of ethical inquiry, namely, the nature of the relation between those elements in conduct which make it useful, and those elements in conduct which make it virtuous. The usefulness of conduct in promoting ends and purposes which are good is, in proportion to the nature and extent of that good, a test and an index of its virtue. But the usefulness of conduct in promoting ends and purposes which are not good, is a mark and index, not of virtue, but of vice. It follows from this that utility in itself has no moral character whatever apart from the particular aim which it tends to accomplish, and that the moral goodness of that aim is presupposed when we speak or think of the utility of conduct as indicative of its virtue. But this character of goodness must be matter of independent and instinctive recognition, because it is the one distinction between the kind of usefulness which is virtuous and the many kinds of usefulness which are vicious. Accordingly we find in the last resort that our recognition of Goodness

in the conduct of other men towards ourselves is inseparable from our own consciousness of the needs and wants of our own life, and of the tendency of that conduct to supply them. This estimate of Goodness seated in the very nature of our bodies and of our minds becomes necessarily, also, a standard of Obligation as regards our conduct to others; for the unity of our nature with that of our kind and fellows is a fact seen and felt intuitively in the sound of every voice and in the glance of every eye around us.

But this great elementary truth of morals, that we ought to do to others as we know we should wish them to do to us, is not the only truth which is intuitively perceived by the Moral Sense. There is, at least, one other among the rudiments of duty which is quite as self-evident, quite as important, quite as far-reaching in its consequences, and quite as early recognised. Obedience to the Will of legitimate Authority is necessarily the first of all motives with which the sense of Obligation is inseparably associated; whilst its opposite, or rebellion against the commands of legitimate Authority, is the spirit and the motive upon which the Moral Sense pronounces its earliest sentence of disapproval and of condemnation. At first sight it may seem as if the legitimacy of any Authority is a previous question, itself requiring to be determined by the Moral

Sense, seeing that it is not until this character of legitimacy or rightfulness has been recognised as belonging to some particular Authority, that obedience to its commands comes in consequence to be recognised as wrong. A moment's consideration, however, will remind us that there is at least one Authority the rightfulness of which is not a question but a fact. All men are born of Parents. All men, moreover, are born in a condition of utter helplessness and of absolute dependence. Moreover, this dependence is not a mere external dependence, such, for example, as the dependence of a slave upon a master. Still less is it like the dependence of us all on the inanimate materials of Nature. It is a dependence arising out of conditions full to overflowing of all the elements to which the sentiment of moral Obligation is necessarily and intuitively attached. It is the least and lowest of these elements that at the breasts of its Mother an infant first satisfies its hunger and its thirst. Other elements follow in an ascending order. In the arms of its Mother it feels the first sense of rest, and the first ideas of refuge and of protection. In the voice of its Mother it hears the first expressions of love, and makes the first responses which that love demands. In the smile of its Mother it first finds the great gift of laughter. In the eyes of its Mother it has its first look into

the mirror of another spirit, and feels the answering tides which are stirring within its own. These are but a part of the great claim accumulating with the hours and days, upon which the authority of a Mother rests. And so it comes to pass that the rightfulness of that Authority is by the necessities of Nature recognised from the first, and when its voice is issued in command, the duty of obedience is felt and known. As a matter of fact, therefore, and not at all as a matter of question or of doubt, our first conception of duty, or of moral Obligation, is necessarily and universally attached to such acts as are in conformity with the injunctions of this first and most indisputable of all Authorities.

Standing, then, on this firm ground of universal and necessary experience, we are able to affirm with absolute conviction, that our earliest conceptions of duty—our earliest exercises of the Moral Sense—are not determined by any considerations of utility, or by any conclusions of the judgment on the results or on the tendencies of conduct.

But the same reasoning, founded on the same principle of simply investigating and ascertaining facts, will carry us a great way farther on. As we grow up from infancy, we find that our Parents are themselves also subject to Authority, owing and owning the duty of obedience to other persons or to other powers. This higher Authority

may be nothing but the rules and customs of a rude Tribe; or it may be the Will of an absolute Sovereign; or it may be the accumulated and accepted Traditions of a Race; or it may be the Laws of a great civilised Community; or it may be the Authority, still higher, of that Power which is known or believed to be supreme in Nature. But in all and in each of these cases, the sense of Obligation is inseparably attached to obedience to some Authority, the legitimacy or rightfulness of which is not itself a question but a fact.

It is true, indeed, that these rightful Authorities, which are enthroned in Nature, are fortified by power to enforce their commands, and to punish violations of the duty of obedience. It is true, therefore, that from the first moments of our existence the sense of Obligation is reinforced by the fear of punishment. And yet we know, both as a matter of internal consciousness, and as a matter of familiar observation in others, that this Sense of Obligation is not only separable from the fear of punishment, but is even sharply contra-distinguished from it. Not only is the Sense of Obligation powerful in cases where the fear of punishment is impossible, but in direct proportion as the fear of punishment mixes or prevails, the moral character of an act otherwise good is diminished or destroyed. The fear of punishment and

the hope of reward are, indeed, auxiliary forces which cannot be dispensed with in society. But we feel that complete goodness and perfect virtue would dispense with them altogether; or rather, perhaps, it would be more correct to say, that the hope of reward would be merged and lost as a separate motive in that highest condition of mind in which the performance of duty becomes its own reward, because of the satisfaction it gives to the Moral Sense, and because of the love borne to that Authority whom we feel it our duty to obey.

The place occupied by this instinctive sentiment in the equipment of our nature is as obvious as it is important. The helplessness of infancy and of childhood is not greater than would be the helplessness of the race if the disposition to accept and to obey Authority were wanting in us. It is implanted in our nature only because it is one of the first necessities of our life, and a fundamental condition of the development of our powers. All Nature breathes the spirit of Authority, and is full of the exercise of command. "Thou shalt," or "Thou shalt not," are words continually on her lips, and all her injunctions and all her prohibitions are backed by the most tremendous sanctions. Moreover, the most tremendous of these sanctions

are often those which are not audibly proclaimed, but those which come upon us most gradually, most imperceptibly, and after the longest lapse of time. Some of the most terrible diseases which afflict humanity are known to be the results of vice, and what has long been known of some of these diseases is more and more reasonably suspected of many others. The truth is, that we are born into a System of things in which every act carries with it, by indissoluble ties, a long train of consequences reaching to the most distant future, and which for the whole course of time affect our own condition, the condition of other men, and even the conditions of external Nature. And yet we cannot see those consequences beyond the shortest way, and very often those which lie nearest are in the highest degree deceptive as an index to ultimate results. Neither pain nor pleasure can be accepted as a guide. With the lower animals, indeed, these, for the most part, tell the truth, the whole truth, and nothing but the truth. Appetite is all that the creature has, and in the gratification of it the highest law of the animal Being is fulfilled. In Man, too, appetite has its own indispensable function to discharge. But it is a lower function, and amounts to nothing more than that of furnishing to Reason a few of the primary data on which it has to work —a few, and a few only. Physical pain is indeed

one of the threatenings of natural Authority; and physical pleasure is one of its rewards. But neither the one nor the other forms more than a mere fraction of that awful and Imperial Code under which we live. It is the Code of an everlasting Kingdom, and of a jurisprudence which endures throughout all generations. It is a Code which continually imposes on Man the abandonment of pleasure, and the endurance of pain, whenever and wherever the higher purposes of its law demand of him the sacrifice. Nor has this spirit of Authority ever been without its witness in the human Spirit, or its response in the human Will. On the contrary, in all ages of the world, dark and distorted as have been his understandings of Authority, Man has been prone to acknowledge it, and to admit it as the basis of Obligation and the rule of duty. This, at all events, is one side of his character, and it is universally recognised as the best.

There is no difficulty, then, in seeing the place which this Instinct holds in the Unity of Nature. It belongs to that class of gifts, universal in the world, which enable all living things to fulfil their part in the Order of Nature, and to discharge the functions which belong to it. It is when we pass from a review of those instincts and powers with which Man has been endowed, to a review of their actual working and results, that we for the first time encounter

facts which are wholly exceptional, and which it is, accordingly, most difficult to reconcile with the unities of Nature. This difficulty does not lie in the mere existence of a Being with powers which require for their perfection a long process of development. There is no singularity in this. On the contrary, it is according to the usual course and the universal analogy of Nature. Development in different forms, through a great variety of stages, and at different rates of progress, is the most familiar of all facts in Creation. In the case of some of the lower animals, and especially in the case of many among the lowest, the process of development is carried to an extent which may almost be said to make the work of Creation visible. There are numberless creatures which pass through separate stages of existence having no likeness whatever to each other. In passing through these stages, the same Organism differs from itself in form, in structure, in the food on which it subsists, and even in the very element in which it breathes and lives. Physiologists tell us that changes having a mysterious and obscure analogy with these, pass over the embryo of all higher animals before their birth. But after birth the development of every individual among the higher orders of creation is limited to those changes which belong to growth, to maturity, and decay. Man shares in these changes, but in addi-

tion to these he undergoes a development which affects him not merely as an individual, but as a species and a race. This is purely a development of mind, of character, and of knowledge, giving, by accumulation from generation to generation, increased command over the resources of Nature, and a higher understanding of the enjoyments and of the aims of life.

It is true, indeed, that this is a kind of development which is itself exceptional—that is to say, it is a kind of development of which none of the lower animals are susceptible, and which therefore separates widely between them and Man. But although it is exceptional with reference to the lower orders of Creation, it is very important to observe that it constitutes no anomaly when it is regarded in connection with Creation as a whole. On the contrary, it is the natural and necessary result of the gift of Reason and of all those mental powers which are its servants or allies. But all Nature is full of these—so full, that every little bit and fragment of its vast domain overflows with matter of inexhaustible interest to that one only Being who has the impulse of inquiry and the desire to know. This power or capacity in every department of Nature of fixing the attention and of engrossing the interest of Man, depends on the close correspondence between his own Faculties

and those which are reflected in Creation, and on his power of recognising that correspondence as the highest result of investigation. The lower animals do reasonable things without the gift of Reason, and things, as we have seen, often involving a very distant foresight, without having themselves any knowledge of the future. They work for that which is to be, without seeing or feeling anything beyond that which is. They enjoy, but they cannot understand. Reason is, as it were, brooding over them and working through them, whilst at the same time it is wanting in them. Between the Faculties they possess, therefore, and the governing principles of the System in which they live and under which they serve, there is, as it were, a vacant space. It is no anomaly that this space should be occupied by a Being with higher powers. On the contrary, it would be the greatest of all anomalies if it were really vacant. It would be strange indeed if there were no link connecting, more closely than any of the lower animals can connect, the Mind that is in Creation with the Mind that is in the Creature. This is the place occupied by Man's Reason—Reason not outside of, but in the Creature—working not only through him, but also in him—Reason conscious of itself, and conscious of the relation in which it stands to that measureless Intelligence of which the Universe is

full. In occupying this place, Man fills up, in some degree at least, what would otherwise be wanting to the Continuity of things; and in proportion as he is capable of development—in proportion as his Faculties are expanded—he does fill up this place more and more.

There is nothing, then, really anomalous or at variance with the Unity of Nature, either in the special elevation of the powers which belong to Man, or in the fact that they start from small beginnings, and are capable of being developed to an extent which, though certainly not infinite, is at least indefinite. That which is really exceptional, and indeed absolutely singular in Man, is the persistent tendency of his development to take a wrong direction. In all other creatures it is a process which follows a certain and determined law, going straight to a definite, consistent, and intelligible end. In Man alone it is a process which is prone to take a perverted course, tending not merely to arrest his progress, but to lead him back along descending paths to results of utter degradation and decay. I am not now affirming that this has been the actual course of Man as a Species or as a Race, when that course is considered as a whole. But that it is often the course of individual men, and that it has been the course of particular races and generations of men in the history of the world,

is a fact which cannot be denied. The general law may be a law of progress ; but it is certain that this law is liable not only to arrest but to reversal. In truth, it is never allowed to operate unopposed, or without heavy deductions from its work. For there is another law ever present, and ever working in the reverse direction. Running alongside, as it were, of the tendency to progress, there is the other tendency to retrogression. Between these two there is a war which never ceases,—sometimes the one, sometimes the other, seeming to prevail. And even when the better and higher tendency is in the ascendant, its victory is qualified and abated by its great antagonist. For just as in Physics the joint operation of two forces upon any moving body results in a departure from the course it would have taken if it had been subject to one alone, so in the moral world almost every step in the progress of Mankind deviates more or less from the right direction. And every such deviation must and does increase, until much that had been gained is again lost in new developments of corruption and of vice. The recognition of this fact does not depend on any particular theory as to the nature or origin of moral distinctions. It is equally clear, whether we judge according to the crudest standard of the Utilitarian scheme, or according to the higher estimates of an Independent Morality. Viewed under either

system, the course of development in Man cannot be reconciled with the ordinary course of Nature, or with the general law under which all other creatures fulfil the conditions of their being.

It is no mere failure to realise aspirations which are vague and imaginary that constitutes this exceptional element in the history and in the actual condition of Mankind. That which constitutes the terrible anomaly of his case admits of perfectly clear and specific definition. Man has been, and still is, a constant prey to appetites which are morbid—to opinions which are irrational—to imaginations which are horrible,—to practices which are destructive. The prevalence and the power of these in a great variety of forms and of degrees is a fact with which we are familiar—so familiar, indeed, that we fail to be duly impressed with the strangeness and the mystery which really belong to it. All savage races are bowed and bent under the yoke of their own perverted instincts—instincts which generally in their root and origin have an obvious utility, but which in their actual development are the source of miseries without number and without end. Some of the most horrible perversions which are prevalent among Savages have no counterpart among any other created Beings, and when judged by the barest standard of utility, place Man immeasurably

below the level of the Beasts. We are accustomed to say of many of the habits of savage life that they are "brutal." But this is entirely to misrepresent the place which they really occupy in the System of Nature. None of the Brutes have any such perverted dispositions; none of them are ever subject to the destructive operation of such habits as are common among men. And this contrast is all the more remarkable when we consider that the very worst of these habits affect conditions of life which the lower animals share with us, and in which any departure from those natural laws which they universally obey, must necessarily produce, and do actually produce, consequences so destructive as to endanger the very existence of the race. Such are all those conditions of life affecting the relation of the sexes which are common to all creatures, and in which Man alone exhibits the widest and most hopeless divergence from the Order of Nature.

It fell in the way of Malthus in his celebrated work on Population to search in the accounts of travellers for those causes which operate, in different countries of the world, to check the progress, and to limit the numbers of Mankind. Foremost among these is vice, and foremost among the vices is that most unnatural one, of the cruel treatment of women. "In every part of the world," says

Malthus, "one of the most general characteristics of the Savage is to despise and degrade the female sex. Among most of the tribes in America, their condition is so peculiarly grievous, that servitude is a name too mild to describe their wretched state. A wife is no better than a beast of burden. While the man passes his days in idleness or amusement, the woman is condemned to incessant toil. Tasks are imposed upon her without mercy, and services are received without complacence or gratitude. There are some districts in America where this state of degradation has been so severely felt that mothers have destroyed their female infants, to deliver them at once from a life in which they were doomed to such a miserable slavery."* It is impossible to find for this most vicious tendency any place among the Unities of Nature. There is nothing like it among the Beasts. With them the equality of the sexes, as regards all the enjoyments as well as all the work of life, is the universal rule. And among those of them in which social instincts have been specially implanted, and whose systems of polity are like the most civilised polities of men, the females of the race are treated with a strange mixture of love, of loyalty, and of devotion. If, indeed, we consider the necessary and inevitable results of the habit prevalent among savage men to

* Malthus, 6th Edition, vol. i. p. 39.

maltreat and degrade their women,—its effects upon the constitution, and character, and endurance of children,—we cannot fail to see how grossly unnatural it is, how it must tend to the greater and greater degradation of the race, and how recovery from this downward path must become more and more difficult or impossible. But vicious, destructive, unnatural as this habit is, it is not the only one or the worst of similar character which prevail among savage men. A horrid catalogue comes to our remembrance when we think of them—polyandry, infanticide, cannibalism, deliberate cruelty, systematic slaughter connected with warlike passions or with religious customs. Nor are these vices, or the evils resulting from them, peculiar to the savage state. Some of them, indeed, more or less changed and modified in form, attain a rank luxuriance in civilised communities, corrupt the very bones and marrow of society, and have brought powerful nations to decay and death.

It is, indeed, impossible to look abroad either upon the past history or the existing condition of Mankind, whether savage or civilised, without seeing that it presents phenomena which are strange and monstrous—incapable of being reduced within the harmony of things, or reconciled with the Unity of Nature. The contrasts which it presents to the general laws and course of Nature cannot be stated

too broadly. There is nothing like it in the world. It is an element of confusion amidst universal order. Powers exceptionally high spending themselves in activities exceptionally base; the desire and the faculty of acquiring knowledge coupled with the desire and the faculty of turning it to the worst account; instincts immeasurably superior to those of other creatures, alongside of conduct and of habits very much below the level of the Beast—such are the combinations with which we have to deal as unquestionable facts when we contemplate the actual condition of Mankind. And they are combinations in the highest degree unnatural; there is nothing to account for, or to explain them in any apparent natural necessity.

The question then arises, as one of the greatest of all mysteries,—how it is and why it is that the higher gifts of Man's nature should not have been associated with corresponding dispositions to lead as straight and as unerringly to the crown and consummation of his course, as the dispositions of other creatures do lead them to the perfect development of their powers and the perfect discharge of their functions in the economy of Nature?

It is as if weapons had been placed in the hands of Man which he has not the strength, nor the knowledge, nor the rectitude of Will to wield aright. It is in this contrast that he stands alone. In the

light of this contrast we see that the corruption of human nature is not a mere dogma of Theology, but a fact of science. The nature of Man is seen to be corrupt not merely as compared with some imaginary standard which is supposed to have existed at some former time, but as compared with a standard which prevails in every other department of Nature at the present day. We see, too, that the analogies of Creation are adverse to the supposition that this condition of things was original. It looks as if something exceptional must have happened. The rule throughout all the rest of Nature is, that every creature does handle the gifts which have been given to it with a skill as wonderful as it is complete, for the highest purposes of its own Being, and for the fulfilment of its part in the Unity of Creation. In Man alone we have a Being in whom this Adjustment is imperfect,—in whom this faculty is so defective as often to miss its aim. Instead of unity of law with certainty and harmony of result, we have antagonism of laws, with results at the best of much shortcoming and often of hopeless failure. And the anomaly is all the greater when we consider that this failure affects chiefly that portion of Man's nature which has the direction of the rest—on which the whole result depends, as regards his conduct, his happiness, and his destiny. The general fact is this—first, that Man is prone to

set up and to invent standards of Obligation which are low, false, mischievous, and even ruinous; and secondly, that when he has become possessed of standards of Obligation which are high, and true, and beneficent, he is prone, first, to fall short in the observance of them, and next, to suffer them, through various processes of decay, to be obscured and lost.

CHAPTER X.

On the Degradation of Man.

IT may be well, before proceeding farther in this branch of our inquiry, to retrace for a little the path we have been following, and to identify the conclusions to which we have been led.

In the first place, we have seen that the Sense of Obligation considered in itself—that is to say, considered apart from the particular actions to which it is attached—is a simple and elementary conception of the Mind, insomuch that in every attempt to analyse it, or to explain its origin and growth, this absurdity can always be detected,—that the analysis or explanation universally assumes the previous existence of that very conception for which it professes to account.

In the second place, we have seen that, just as Reason, or the logical Faculty, begins its work with the direct perception of some simple and elemen-

tary truths, of which no other account can be given than that they are intuitively perceived, or, in other words, that they are what is called "self-evident," so, in like manner, the Moral Sense begins its work with certain elementary perceptions and feelings in respect to conduct, which arise out of the very nature of things, and come instinctively to all men. The earliest of these feelings is the Obligation of obedience to that first Authority the rightfulness of which over us is not a question but a fact. The next of these feelings is the Obligation of acting towards other men as we know we should like them to act towards ourselves. The first of these feelings of Obligation is inseparably associated with the fact that all men are born helpless, absolutely dependent, and subject to Parents. The second of these feelings of Obligation is similarly founded on our conscious community of nature with other men, and on the consequent universal applicability to them of our own estimates of good and evil.

In the third place, we have seen that this association of the higher powers of Man with rudimentary data which are supplied by the facts of Nature, is in perfect harmony with that condition of things which prevails throughout Creation,—the condition, namely, that every creature is provided from the first with just so much of instinct and of

impulse as is requisite to propel and guide it in the kind and to the measure of development of which its Organism is susceptible, leading it with unfailing regularity to the fulfilment of the law of its own Being, and to the successful discharge of the functions assigned to it in the world.

In the fourth place, we have seen that the only really exceptional fact connected with Man is—not that he has faculties of a much higher kind than other creatures, nor that these faculties are susceptible of a corresponding kind and measure of development—but that in Man alone this development has a persistent tendency to take a wrong direction, leading not towards, but away from, the perfecting of his powers.

In the last place, we have seen that as a matter of fact, and as a result of this tendency, a very large portion of Mankind, embracing almost all the savage races, and large numbers of men among the most civilised communities, are a prey to habits, practices, and dispositions which are monstrous and unnatural—one test of this unnatural character being that nothing analogous is to be found among the lower animals in those spheres of impulse and of action in which they have a common nature with our own; and another test being that these practices, habits, and dispositions are always directly injurious and often even fatal to the race. For-

bidden thus and denounced by the highest of all Authorities, which is the Authority of Natural Law, these habits and practices stand before us as unquestionable exceptions to the Unity of Nature, and as conspicuous violations of the general harmony of Creation.

When, however, we have come to see that such is really the character of these results, we cannot be satisfied with the mere recognition of their existence as a fact. We seek an explanation and a cause. We seek for this, moreover, in a very different sense from that in which we seek for an explanation and a cause of those facts which have the opposite character of being according to law and in harmony with the analogies of Nature. With facts of this last kind, when we have found the place into which they fit in the order of things, we can and we do rest satisfied as facts which are really ultimate—that is to say, as facts for which no other explanation is required than that they are part of the Order of Nature, and are due to that one great cause, or to that combination of causes, from which the whole harmony and Unity of Nature is derived. But when we are dealing with facts which cannot be brought within this category,—which cannot be referred to this Order, but which are, on the contrary, an evident departure from it,—then we must feel that these facts require an explanation and a cause

as special and exceptional as the results themselves.

There is, indeed, one theory in respect to those mysterious aberrations of Human Character, which, although widely prevalent, can only be accepted as an explanation by those who fail to see in what the real difficulty consists. That theory is, that the vicious and destructive habits and tendencies prevailing among men, are not aberrant phenomena at all, but are original conditions of our nature,—that the very worst of them have been primitive and universal, so that the lowest forms of savage life are the nearest representatives of the primordial condition of the race.

Now, assuming for the present that this were true, it would follow that the anomaly and exception which Man presents among the unities of Nature is much more violent and more profound than on any other supposition. For it would represent the contrast between his instincts and those of the lower animals as greatest and widest at the very moment when he first appeared among the creatures which, in respect to these instincts, are so superior to himself. And it is to be observed that this argument applies equally to every conceivable theory or belief as to the origin of Man. It is equally true whether he was a special creation, or an unusual birth, or the result

of a long series of unusual births, each marked by some new accession to the aggregate of faculties which distinguish him from the lower animals. As regards the anomaly he presents, it matters no which of these theories of his origin be held. If his birth, or his creation, or his development, whatever its methods may have been, took place after the analogy of the lower animals, then, along with his higher powers of mind, there would have been corresponding instincts associated with them to guide and direct those powers in their proper use. It is in this essential condition of all created things that Man, especially in his savage state, presents an absolute contrast with the Brutes. It is no explanation, but, on the contrary, an insuperable increase of the difficulty, to suppose that this contrast was widest and most absolute when Man made his first appearance in the world. It would be to assume that, for a most special and most exceptional result, there was no special or exceptional cause. If Man was, indeed, born with an innate propensity to maltreat his women, to murder his children, to kill and eat his fellow, to turn the physical functions of his nature into uses which are destructive to his race, then, indeed, it would be literally true that

> "Dragons of the prime,
> That tear each other in their slime,
> Were mellow music matched with him."

It would be true, because there were no dragons of the prime, even as there are no reptiles of the present age—there is no creature, however terrible or loathsome its aspect may be to us, among all the myriads of created things—which does not pass through all the stages of its development with perfect accuracy to the end, or which, having reached that end, fails to exhibit a corresponding harmony between its propensities and its powers, or between both of these and the functions it has to perform in the economy of Creation. So absolute and so perfect is this harmony, that men have dreamed that somehow it is self-caused, the need and the requirement of a given function producing its appropriate Organ, and the Organ again reacting on the requirement and the need. Whatever may be the confusion of thought involved in this idea, it is at least an emphatic testimony to the fact of an order and an adjustment of the most perfect kind prevailing in the work of what is called Evolution, and suggesting some cause which is of necessary and universal operation. The nearer therefore we may suppose the origin of Man may have been to the origin of the Brutes, the nearer also would his condition have been to the fulfilment of a law which is of universal application among them. Under the fulfilment of that law the higher gifts and powers with which Man is endowed would have run

smoothly their appointed course, would have unfolded as a bud unfolds to flower,—as a flower ripens into fruit,—and would have presented results absolutely different from those which are actually presented either by the savage, or by what is called the civilised, condition of Mankind.

And here it may be well to define, as clearly as we can, what we mean by Civilisation, because the word is very loosely used, and because the conceptions it involves are necessarily complex. Usually it is associated in our minds with all that is highest in the social, moral, and political condition of the Christian nations as represented in our own country and in our own time. Thus, for example, respect for human life, and tenderness towards every form of human suffering, is one of the most marked features of the best modern culture. But we know that this sentiment, and many others which are related to it, were comparatively feeble in the case of other societies which, nevertheless, we acknowledge to have been very highly civilised. We must, therefore, attach some more definite and restricted meaning to the word, and we must agree to understand by Civilisation only those characteristic conditions which have been common to all peoples whom we have been accustomed to recognise as among the governing nations of the world. And when we come to con-

sider what these characteristics are, we find that, though complex, they are yet capable of being brought within a tolerably clear and simple definition. The Latin word *civis*, from which our word Civilisation comes, still represents the fundamental conception which is involved. The citizen of an imperial City,—the subject of an imperial Ruler,—the member of a great State,—this was the condition which constituted the Roman idea of the rank and status of Civilisation. No doubt many things are involved in this condition, and many other things have come to be associated with it. But the essential elements of the civilised condition, as thus defined or understood, can readily be separated from others which are not essential. An extended knowledge of the useful arts, and the possession of such a settled system of Law and Government as enables men to live in great political communities, these are the essential features of what we understand by Civilisation. Other characteristics may co-exist with these, but nothing more is necessarily involved in a proper understanding, or even in the usual application of the word. In particular, we cannot affirm that a civilised condition involves necessarily any of the higher moral elements of character. It is true, indeed, that no great State, nor even any great City, can have been founded and built up without courage and patriotism.

Accordingly these were perhaps the most esteemed virtues of antiquity. But these are by no means confined to civilised men, and are, indeed, often conspicuous in the Savage and in the Barbarian. Courage, in at least its lower forms, is one of the commonest of all qualities; and patriotism, under the like limitation, may almost be said to be an universal passion. It is in itself simply a natural consequence of the Social Instinct, common to Man and to many of the lower animals—that Instinct which leads us to identify our own passions and our own sympathies with any brotherhood to which we may belong,—whatever the associating tie of that brotherhood may be,—whether it be morally good, bad, or indifferent. Like every other instinct, it rises in its moral character in proportion as it is guided by reason and by conscience, and in proportion as, through these, it becomes identified with duty and with self-devotion. But the idea of Civilisation is in itself separate from the idea of virtue. Men of great refinement of manners may be, and often are, exceedingly corrupt. And what is true of individuals is true of communities. The highest civilisations of the heathen world were marked by a very low code of morals, and by a practice even lower than their code. But the intellect was thoroughly cultivated. Knowledge of the useful arts, taste in the fine arts, and elaborate systems

both of civil polity and of military organisation, combined to make, first Greek, and then Roman, civilisation, in such matters the basis of our own.

It is, therefore, only necessary to consider for a moment these essential characteristics of what we mean by Civilisation, to see that it is a conception altogether incongruous with any possible idea we can form of the condition of our First Parents, or, indeed, of their offspring for many generations. An extended knowledge of the useful arts is of necessity the result of accumulation. Highly organised systems of polity were both needless and impossible before settled and populous communities had arisen. Government was a simple matter when the "world's grey fathers" exercised over their own children the first and the most indisputable of all authorities.

It is unfortunate that the two words which are habitually used to indicate the condition opposite to that of Civilisation are words both of which have come to mean a great deal more than mere ignorance of the useful arts, or a merely rudimentary state of Law and Government. These two words are Barbarism and Savagery. Each of these has come to be associated with the idea of special vices of character and of habit, such as cruelty and ferocity. But "Barbarian," in the classical language from which it came to us, had no such meaning. It was applied

indiscriminately by the Greeks to all nations, and to all conditions of society other than their own, and did not necessarily imply any fault or failure other than that of not belonging to the race, and not partaking of the culture which was then, in many respects at least, the highest in the world. St. Paul refers to all men who spoke in any tongue unknown to the Christian communities as men who were "to them barbarians." But he did not associate this term with any moral faults, such as violence or ferocity; on the contrary, in his narrative of his shipwreck on the coast of Malta, he calls the natives of that Island "barbarous people" in the same sentence in which he tells us of their kindness and hospitality. This simple and purely negative meaning of the word barbarian has been lost to us, and it has become inseparably associated with characteristics which are indeed common among uncivilised nations, but are by no means confined to them. The epithet "savage," of course, still more distinctly means something quite different from rude, or primitive, or uncultivated. The element of cruelty or of ferocity is invariably present to the mind when we speak of savagery, although there are some races—as, for example, the Eskimo —who are totally uncivilised, but who, in this sense, are by no means savage.

And this may well remind us that, as we have

found it necessary to define to ourselves the condition which we are to understand by the word Civilisation, so it is not less essential to define and limit the times to which we are to apply the word Primeval. For this word also is habitually used with even greater laxity of meaning. It is often employed as synonymous with primitive, and this again is applied not only to all times which are prehistoric, but to all conditions even in our own age which are rude or savage. There is an assumption that, the farther we go back in time, there was not only less and less extensive knowledge of the useful arts,—not only simpler and simpler systems of life and polity,—but also that there were deeper and deeper depths of the special characteristics of the modern Savage. We have, however, only to consider what some of these characteristics are, to be convinced that although they may have arisen in early times, they cannot possibly have existed in the times which were the earliest of all. Things may have been done, and habits may have prevailed, when the multiplication and dispersion of Mankind had proceeded to a considerable extent, which cannot possibly have been done, and which cannot possibly have prevailed when as yet there was only a single pair of Beings "worthy to be called" man and woman, nor even when as yet all the children of that pair knew themselves to be of one family and blood.

The word Primeval ought, if it is to have any definite meaning at all, to be confined to this earliest time alone. It has already been pointed out, that on the supposition that the condition of primeval Man approximated to the condition of the lower animals, that condition could not have been nearer to, but must, on the contrary, have been very much farther removed from, the condition of the modern Savage. If, for example, there ever was a time when there existed on one spot of Earth, or even on more spots than one, a single pair of human Beings, it is impossible that they should have murdered their offspring, or that they should have killed and eaten each other. Accordingly it is admitted that cannibalism and infanticide, two of the commonest practices of savage and of barbarous life, cannot have been Primeval. But this is a conclusion of immense significance. It hints to us, if it does no more, that what is true of one savage practice may possibly be true of others. It breaks down the presumption that whatever is most savage is therefore probably the most ancient.

And then, when we come to think of it, this idea, from being vague and general, rises into suggestions which are definite and specific. On the great fundamental subject of the relation of the sexes, conclusions not less important than those respecting cannibalism and infanticide are forced upon our con-

viction. We have seen that the cruel treatment of the female sex is almost universal among Savages, and that it is entirely unknown among the lower animals. It is in the highest degree improbable and unnatural to suppose that this habit can have been Primeval. But the same considerations carry us a great deal farther. They raise a presumption in favour of the later origin of other habits and customs which are not confined to the savage state, but have prevailed, and do now prevail, among nations comparatively civilised. There can have been no polygamy when as yet there was only a single pair, or when there were several single pairs widely separated from each other. The presumption, if not the certainty, therefore is, that Primeval Man must have been monogamous. It is a presumption supported by the general equality of the sexes in respect to the numbers born, with only just such an excess of the male sex as tends to maintain that equality against the greater risks to life arising out of manly pursuits and duties. Thus the facts of Nature point to polygamy as in all probability a departure from the habits of primeval times. Like considerations set aside, as in a still higher degree unnatural and improbable, the primeval rank of other customs of which the historians of human culture tell us, and probably tell us truly, that there are many surviving traces among the existing

customs of men. Thus "marriage by capture" cannot have been Primeval. It may be very ancient; but it cannot possibly have arisen until the family of Man had so multiplied and scattered, that they had become divided into tribes accustomed to act with violence towards each other. And then as regards a custom still more barbarous and savage, namely, that of polyandry, and that which is now euphemistically called "communal marriage," apart from the strong presumption in favour of primeval monogamy, they are stamped by many separate considerations as corruptions and as departures from primeval habits. In the first place, all such customs are fatally injurious to the propagation of the race. In the second place, they are unknown in the animal world. In the third place, their origin can be assigned, in many cases, if not with certainty at least with the highest probability, to one cause, and that is the previously-acquired habit of female infanticide. But as regards this last habit, besides the certainty that it cannot have been Primeval, we know that it has often arisen from customs such as the exorbitant cost of marriage portions, which can only have grown up under long-developed and highly artificial conditions of society.

But powerful as all these separate considerations are to raise at least adverse presumptions against the primeval rank of the worst and commonest

characteristics of savage life, the force of these considerations is much increased when we find that they are closely connected together, and that they all lead up to the recognition of a principle and a law. That principle is no other than the principle of Development; that law is no other than the law of Evolution. It is a curious misunderstanding of what that law really is, to suppose that it leads only in one direction. It leads in every direction in which there is at work any one of the "potential energies" of Nature. Development is the growth of germs, and according to the nature of the germ so is the nature of the growth. The flowers and fruits which minister to the use of Man have each their own seed, and so have the briars and thorns which choke them. Evil has its germs as well as good, and the evolution of them is accompanied by effects to which it is impossible to assign a limit. Movement is the condition of all Being, in moral as well as in material things. Just as one thing leads to another in knowledge and in virtue, so does one thing lead to another in ignorance and vice. Those gradual processes of change which arise out of action and reaction between the external condition and the internal nature of Man have an energy in them of infinite complexity and power. We stand here on the firm ground of observation and experience. In the shortest space of time, far within the

limits even of a single life, we are accustomed to see such processes effectual both to elevate and degrade. The weak become weaker, and the bad become worse. "To him that hath more is given, and from him that hath not is taken even that which he seemeth to have." And this law, in the region of character and of morals, is but the counterpart of the law which prevails in the physical regions of Nature, where also Development has its double aspect. It cannot bring one Organism to the top, without sinking another Organism to the bottom. That vast variety of natural causes which have been grouped and almost personified under the phrase "Natural Selection," are causes which necessarily include both favourable and unfavourable conditions. Natural Rejection, therefore, is the inseparable correlative of Natural Selection. In the battle of life the triumph of one individual, or of one species, is the result of causes which bring about the failure of another. But there is this great distinction between the lower animals and Man,—that in their case failure involves death and complete extinction, whilst in his case it is compatible with prolonged survival. So far as mere existence is concerned, the almost infinite plasticity and adaptability of his nature enable him to accommodate himself to the hardest lot, and to the most unfavourable conditions. Man is the only animal whose

possible distribution is not limited to narrow, or comparatively narrow, areas, in consequence of exclusive dependence upon particular conditions of climate and of productions. Some such conditions of a highly favourable kind may, and indeed must, have governed the selection of his birthplace and of his infancy. But when once born and fairly launched upon his course, it was in his nature to be able to prevail over all or over most of the limitations which are imposed upon the lower animals. But it is this very power of adaptation to unfavourable circumstances which involves of necessity the possibility of his development taking an equally unfavourable direction. If he can rise to any level, so also can he descend to any depth. It is not merely that faculties, for the exercise of which there is no call and no opportunity, remain dormant, but it is, also, that if such faculties have already been exercised, they may and often do become so stunted that nothing but the rudiments remain.

With such immense possibilities of change inherent in the nature of Man, we have to consider the great element of Time. Strangely enough, it seems to be very commonly assumed that the establishment of a great antiquity for the human race has some natural, if not some necessary, connection with the theory that Primeval Man stood on some level far lower even than any existing Savage.

And no doubt this connection would be a real one if it were true that during some long series of ages Development had not only been always working, but had always been working upwards. But if it be capable of working, and if it has been actually working, also in the opposite direction, then the element of Time in its bearing upon conditions of modern savagery must have had a very different operation. For here it is to be remembered that the Savage of the present day is as far removed in time from the common origin of our race as the man who now exhibits the highest type of moral and intellectual culture. Whether that time is represented by six thousand, or ten thousand, or a hundred thousand years, it is the same for both. If therefore the number of years since the origin of Man be taken as a multiplier in the processes of elevation, it must be taken equally as a multiplier in the processes of degradation. Not even on the theory which some hold, that the human species has spread from more than one centre of birth or of creation, can this conclusion be affected. For even on this hypothesis of separate origins, there is no reason whatever to suppose that the races which are now generally civilised are of more recent origin than those which are generally savage. Presumably, therefore, all the ages which have been at work in the development of Civilisation have been at work equally in the

development of Savagery. It is not possible in the case of Savagery, any more than in the case of Civilisation, that all those ages have been without effect. Nor is it possible that the changes they have wrought have been all in one direction. The conclusion is, that neither Savagery nor Civilisation, as we now see them, can represent the primeval condition of Man. Both of them are the work of time. Both of them are the product of Evolution.

When, however, this conclusion has been reached, we naturally seek for some understanding—some definite conception—of the circumstances and conditions under which Development in Man has taken a wrong direction. No similar explanation is required of the origin of Civilisation. This is the development of Man's powers in the natural direction. Great interest, indeed, attaches to the steps by which knowledge has been increased, and by which invention has been added to invention. But there is no mystery to be encountered here—no dark or distressing problem to be solved. This kind and direction of development is all according to the constitution and course of things. It is in harmony with all the analogies of Creation. Very different is the sense of painful wonder with which we seek an explanation of the wretched condition of Man in many regions of the Globe, and, still more, with which we seek the origin or the cause of all the hideous

customs which are everywhere prevalent among savage men, and which often, in their ingenuity of evil, and in the sweep of their destructive force, leave it a wonder that the race survives at all.

There are, however, some considerations, and some facts, on which we may very safely advance at least a few steps towards the explanation we desire. Two great causes of change, two great elements of Development or Evolution, have been specified above—namely, the external conditions and the internal nature of Man. Let us look at them for a little separately, in so far as they can be separated at all.*

It is certain that external or physical conditions have a very powerful, and sometimes a very rapid, effect both on the body and on the mind of Man. The operation of this law has been seen and noted even in the midst of the most highly civilised communities. There are kinds of labour which have been found to exert a rapid influence in degrading the human frame, and in deteriorating the human character. So marked has been this effect, that it has commanded the attention of Parliaments, and the course of Legislation has been turned aside to meet the dangers it involved. Moreover, our ex-

* The argument which follows was urged in a former work on "Primeval Man." It has been here re-written and re-considered with reference to various objections and replies.

perience in this matter has been very various. Different kinds of employment, involving different kinds of unfavourable influence, have each tended to develop its own kind of mischief, and to establish its own type of degradation. The particular conditions which are unfavourable may be infinitely various. The evils which arise out of the abuses of civilised life can never be identical with the evils to which the earlier races of Mankind may have been exposed. But the power of external conditions in modifying the form, and in moulding the character of men, is stamped as a general law of universal application.

In connection with this law, the first great fact which calls for our attention is the actual distribution of Mankind in relation to the Physical Geography of the Globe. That distribution is nearly universal. From the earliest times when civilised men began to explore distant regions, they found everywhere other races of men already established. And this has held true down to the latest acquisitions of discovery. When the New World was discovered by Columbus, he found that it must have been a very old world indeed to the human species. Not only every great Continent, but, with rare exceptions, even every habitable Island, has been found peopled by the genus Homo. The explorers might find, and in many cases did

actually find, everything else in Nature different from the country of their birth. Not a beast, or bird, or plant,—not an insect, or a reptile, or a fish, might be the same as those of which they had any previous knowledge. The whole face of Nature might be new and strange—but always with this one solitary exception, that everywhere Man was compelled to recognise himself—represented, indeed, often by people of strange aspect and of strange speech, but by people nevertheless exhibiting all the unmistakable characters of the human race.

In ancient times, before the birth of physical science, this fact might not appear so singular and exceptional as it really is. Before Man had begun to form any definite conceptions as to his own origin, or as to his place in Nature, it was easy to suppose in some vague way that the inhabitants of distant regions were "Aborigines," or as the Greeks called them "Autocthonoi"—that they were somehow native to the soil, and had sprung from it. But this conception belongs essentially to that stage and time when tradition has been lost, and before reasoning has begun. Those who refuse to accept the Jewish Scriptures as in any sense authoritative, must at least recognise them as the records of a very ancient and a very sublime Cosmogony. That Cosmogony rests upon these four leading ideas—first, that the Globe has been brought to its present condition through Days of

Change; secondly, that from a state which can only be described as Chaos, it came to be divided into Sea, and Land, and Atmosphere; thirdly, that the lower animals were born first,—Man being the last as he is the highest product of Creation; fourthly, that he appeared first at one place only in the world, and that from one pair has all the Earth been overspread.

It is remarkable that in this general outline of events, and especially in the unity of Man's origin, the progress of discovery, and those later speculations which have outrun discovery, are in strict accordance with the tradition recorded by the Jewish Prophets. There are, indeed, some scientific men who think that different races of men represent different species—or, at least, that if Man be defined as one species, it is a species which has spread from more than one place of origin. But those who hold to this idea are men who stand outside the general current of scientific thought. The tendency of that thought is more and more to demand unity and simplicity in our conception of the Methods of Creation, and of the order of events through which the birth of Species has been brought about. So strong is this tendency, and so intimately connected is it with the intellectual conceptions on which the modern theory of Development has been founded, that Mr. Darwin himself, and Mr. Wallace, who may

be said to be joint-author with him of that theory, both lay it down as a fundamental postulate, that each new Organic Form has originated, and could only originate, at one place. This doctrine is by no means a necessity of thought, nor is it a necessary consequence of the theory of Development. It rests mainly on the doctrine of chances,* and that doctrine may be wholly inapplicable to events which are governed not by accident but by Law. It is, however, a postulate of the particular form of that theory which Mr. Darwin has adopted. It is not always easy to reconcile this postulate with the existing distribution over the Globe of animal Forms. But it is not absolutely inconsistent with the facts so far as we know them; and it is interesting to observe how universally and tacitly it is assumed in all the current explanations of the history of Creation. On this point, therefore, of the unity of Man's origin, those who bow to the authority of the most ancient and the most venerable of traditions, and those who accept the most imposing and the most popular of modern scientific theories, are found standing on common ground, and accepting the same result.

And when we come to consider a very curious subject, namely, the configuration of the habitable

* In this passage I rely on a private letter to myself from Mr. Darwin, in which he rested the conclusion referred to upon the chances against the same Form becoming developed in more places than one.

Continents of the Globe, we find that this configuration stands in a very intelligible relation to the dispersion of Mankind from a single centre. If, indeed, we could suppose that the earliest condition of our race was a condition of advanced knowledge in the useful arts, there would be no difficulty to solve. The great Oceans of the world are now the easiest highways of travel and consequently of dispersion. The art and the science of navigation has made them so. But we cannot imagine that this art or this science was known to our forefathers of a very early age. Various means of crossing narrow waters, from the use of solid logs of wood to the use of the same logs when hollowed out, and so to the use of canoes and boats, were in all probability among the very earliest of human inventions. But not the less would it have been impossible with these inventions to cross the Atlantic, or the Pacific, or the Indian Ocean, or even many of the more limited tracts of Sea which now separate so many habitable regions. Some other solution must be found for the problem presented by the fact that the earliest navigators who traversed those Seas and Oceans, have always found the lands on the other side already colonised, and in some cases thickly inhabited by races and nations which had made considerable advances in civilisation. Yet, this problem presents no serious difficulty in accepting

the unity of the human race, when it is regarded in the light of Physical Geography.

The distribution of the larger tracts of Land and Sea upon our Planet is very singular indeed. Attached to the southern Pole there is no mass of Land which stretches so far north as to enter the latitudes which are even moderately temperate. In the centre of the Antarctic Circle there is probably a great Continent. But it is a Continent where volcanic fires burst here and there through surfaces which are bound in perpetual ice. Round that vast Circle roll the continuous waves of an Ocean vexed by furious storms, and laden with the gigantic wrecks of immeasurable fields and cliffs of ice. In the northern hemisphere, round the Arctic Circle, on the contrary, everything is different. There Land-masses begin, which stretch southward without a break through all the temperate and through all the torrid zones on both sides of the Equator. Then, again, all these great Continents of the Globe, as they extend towards the south, become narrower and narrower, and so tend to become more and more widely separated from each other by vast oceanic spaces. Towards the north, on the contrary, all these Continents converge, and at one point, Behring's Straits, they approach so near each other, that only a space of some forty miles of sea intervenes between them. The result is, that

in the northern hemisphere there is either a continued connection by land, or a connection severed only by comparatively narrow channels, between all the great inhabited Continents of the world. The consequences of this, as bearing on the dispersion of Mankind, are obvious at a glance. If, for example, Man may be supposed to have been born in any part of Western or Central Asia, it is easy to see how his earliest migrations might lead him without serious difficulty into every one of the lands in which his children have been actually found. The Indian Peninsula was at his feet. A natural bridge, as it were, would enable him to penetrate the Arabian deserts, and would conduct him by the glorious valley of the Nile into the heart of the Continent of Africa. Eastwards he had before him the fertile tracts of China, and beyond the narrow passage of Behring's Straits lay that vast Continent which, when re-discovered from the West, was called the New World. Again, beyond the southern spurs of the great Asiatic Continent there lay an Archipelago of magnificent Islands, with comparatively narrow Seas between them, and connected by a continuous chain with the continental Islands of Australasia. The seafaring habits which would spring up among an insular population,—especially in an Archipelago where every volcanic cone and every coral reef rising above the waves was rich in the products of

a bounteous vegetation,—would soon lead to a rapid development of the arts of navigation. When these were once acquired, there is no difficulty in accounting for the gradual dispersion of the human race among the beautiful Islands of the Pacific. Across its comparatively peaceful waters it is not improbable that even rude navigators may have made their way at various times to people the western shores of the Continent of America.

It is true indeed that the science of Geology teaches us that the distribution of Sea and Land has been immensely various in different epochs of the unmeasured ages which have been occupied in the formation of our existing world. And it may be urged from this that no argument on the methods of dispersion can be based with safety upon that distribution as it now is. There is not much force, however, in this plea. For it is equally true that the evidence afforded by Geology is in favour of the very great antiquity of the principal Land-masses, and of the great Oceanic hollows which now divide them. The antiquity of these is almost certainly much greater than the antiquity of Man. The fauna and the flora of the principal Continents indicate them to have been separated since a period in the development, or in the creation of Species, long anterior to any probable estimate of the time of Man's appearance. Even if that

appearance dates from the Miocene epoch in Geology,—which is an extreme supposition,—no great difference in the problem of the dispersion of our species would arise. Since that time indeed it is certain that great subsidences and elevations of land have taken place. But although these changes have greatly altered the outlines of Sea and Land along the shores of Europe and of America, there is no reason to believe that they could have materially affected, either injuriously or otherwise, the earlier migrations of Mankind.

But although the peculiar Physical Geography of the Globe makes it easy to understand how, from a single centre, it must have been quite possible for a creature with the peculiar powers and faculties of Man to distribute himself, as he has actually been found distributed over every habitable region of the world, it is most important to observe the very adverse conditions to which, in the course of this distribution, particular portions of the human family must have been, and to which we do now find them actually exposed.

The "New World"—the American Continent—is that which presents the most uninterrupted stretch of habitable land from the highest northern to the lowest southern latitude. No part of it was without human inhabitants when the civilised children of the Old World first came upon it, and

when, from its mountain tops, they first "stared on the Pacific." On its extreme north there was the Eskimo or Inuit race, maintaining human life under conditions of extremest hardship, even amid the perpetual ice of the Polar regions. On the extreme south—at the opposite extremity of the great American Continent—there were the inhabitants of Cape Horn and of the Island off it, both of which project their desolate rocks into another of the most inhospitable climates of the world. Let us take this case first—because it is a typical one, and because it happens that we have from a master-hand a description of these people, and a suggestion of the questions which they raise. The natives of Tierra del Fuego are one of the most degraded among the races of Mankind. How could they be otherwise? "Their country," says Mr. Darwin, "is a broken mass of wild rocks, lofty hills, and useless forests; and these are viewed through mists and endless storms. The habitable land is reduced to the stones of the beach. In search of food they are compelled to wander unceasingly from spot to spot; and so steep is the coast that they can only move about in their wretched canoes." They are habitual cannibals, killing and eating their old women before they kill their dogs, for the sufficient reason, as explained by themselves, "Doggies catch others: old women,

no." Of some of these people who came round the *Beagle* in their canoes the same author says: "These were the most wretched and miserable creatures I anywhere beheld. They were quite naked, and even one full-grown woman was absolutely so. It was raining heavily, and the fresh water, together with the spray, trickled down her body. In another harbour not far distant, a woman who was suckling a new-born child, came one day alongside the vessel and remained there out of mere curiosity, whilst the sleet fell and thawed on her naked bosom, and on the skin of her naked baby. These poor wretches were stunted in their growth, their hideous faces bedaubed with white paint, their skins filthy and greasy, their hair entangled, their voices discordant, and their gestures violent. Viewing such men, one can hardly make one's-self believe that they are fellow-creatures and inhabitants of the same world." Such are the facts, or one aspect of the facts, connected with this people. But there are other facts, or another aspect of the same facts, not less important which we have on the same evidence. Beneath this crust of Savagery lay all the perfect attributes of Humanity —ready to be developed the moment the unfavourable conditions of Fuegian life were exchanged for conditions which were different. Captain Fitzroy had, in 1830, carried off some of these poor people

to England, where they were taught the arts and the habits of Civilisation. Of one of those who was taken back to his own country in the *Beagle*, Mr. Darwin tells us that "his intellect was good," and of another that he had a "nice disposition."

Let us look now at the questions which the low condition of the Fuegians suggests to Mr. Darwin. "Whilst beholding these Savages, one asks whence have they come? What could have tempted, or what change compelled, a tribe of men to leave the fine regions of the north, to travel down the Cordillera or backbone of America, to invent and build canoes which are not used by the tribes of Chili, Peru, and Brazil, and then to enter one of the most inhospitable countries within the limits of the Globe?"

These questions of Mr. Darwin, it will be observed, assume that Man is not indigenous in Tierra del Fuego. They assume that he has come from elsewhere into that savage country. They assume farther that his access to it has been by land. They assume that the progenitors of the Fuegians who first came there were not skilled navigators like the crew of the *Beagle*, able to traverse the Atlantic or the Pacific in their widest and stormiest expanse. These assumptions are surely safe. But these being accepted, it follows that the ancestors of the Fuegians must have come

from the North, and must have passed down the whole length, or a great part of the length, of the American Continent. In other words, they must have come from regions which are highly favoured into regions of extremest rigour. If external circumstances have any influence upon the condition of Man, this great change cannot have been without effect. Accordingly, Mr. Darwin at once, instinctively as it were, connects the utter savagery of the Fuegians with the wretched conditions of their present home. "How little," he says, "can the higher powers of the mind be brought into play! What is there for imagination to picture, for reason to compare, for judgment to decide upon." It is in perfect accordance with this view that on every side of them, and in proportion as we pass northwards from their wretched country, we find that the tribes of South America are less wretched, and better acquainted with the simpler arts. None of the depressing and stupefying conditions which attach to the present home of the Fuegians can be alleged of the regions in which some distant ancestors of the Fuegians must have lived. In Chili, in Peru, in Brazil, in Mexico, there are boundless tracts in which every condition of nature, soil, climate, and productions, are comparatively as favourable to men as they are unfavourable on the desolate shores of Cape Horn and Tierra del

Fuego. Yet one or other of these many well-favoured regions must have been on the line of march by which the Fuegian shores were reached. One and all of them present attractions which must have induced a long encampment, and must have made them the home of many generations. Why was that march ever resumed in a direction so uninviting and pursued to a destination so desolate and so miserable?

But the moment we come to ask this question in respect to the Fuegians, we find that it is a question which arises equally out of the position and life of many other portions of the human family. The northern extremity of the American Continent presents exactly the same problem as the southern. If it is impossible to suppose that Man was first created, or born, or developed in Tierra del Fuego, it is not less impossible to suppose that he made his first appearance on the frozen shores of Baffin's Bay. Watching at the blow-hole of a Seal for many hours in a temperature 75° below the freezing point, is the constant work of the Inuit hunter. And when at last his prey is struck, it is his greatest luxury to feast upon the raw blood and blubber. To civilised Man it is hardly possible to conceive a life so wretched, and in some aspects at least so brutal, as the life led by this race during the continual night of the Arctic winter. Not even

the most extravagant theorist as regards the possible plurality of human origins can believe that there was a separate Eskimo Adam. Man, therefore, is as certainly an immigrant into the dreary regions round the Pole as he is an immigrant into the desolations of Cape Horn. But the whole conditions of his life there are necessarily determined by the rigours of the climate. They are conditions in which Civilisation, as it has been here defined, is impossible. And the importance of that definition is singularly apparent in the case of the Eskimo. Although essentially uncivilised, he is not, in the ordinary sense of the word, a Savage. Many of the characteristics usually associated with that word are altogether wanting in the Eskimo. They are a gentle, inoffensive, hospitable, and truthful race. They are therefore a conspicuous example of the fallacy of supposing that there is any necessary connection between a backward condition of knowledge in the useful arts, and violent dispositions, or ferocious and cruel habits. Men are not necessarily savage because they may use flint hatchets, or because they may point their arrows and their spears with bone. Nevertheless, the condition of the Eskimo, although not savage, is almost the type of the merely uncivilised condition of Mankind. It is a condition in which not more than

a few families can ever live together, and in which therefore large communities cannot be formed. A few simple and some very curious rules of ownership are all that can represent among them the great lawgiving instinct which lives in Man. Agriculture cannot be practised, nor even the pasturing of flocks and herds. Without fuel, beyond the oil which feeds their feeble lamps, or a few stray logs of drift timber, the Eskimo can have no access to the metals, which in such a country could not be reduced from their ores, even if these ores were themselves obtainable. The useful arts are, therefore, strictly limited to the devising and making of canoes and of weapons of the chase. There is no domestic animal except the Dog; and Dogs too, like their masters, must have been brought from elsewhere. These are all conditions which exclude the first elements of what we understand by Civilisation. But every one of these conditions must have been different with the progenitors of the Eskimo. If they were immigrants into the regions within the Arctic Circle, they must have come from the more temperate regions of the South. They must have been surrounded there by all the natural advantages of which their descendants are now deprived. To what extent these ancestors of the Eskimo may have profited by their very different and more

favoured position, we cannot know. They may have practised such simple agriculture as was practised by the most ancient races which have left their traces in the Swiss Lake dwellings. They may have been nomads, living on their flocks and herds, as the Laplanders and Siberians actually are who in the Old World live in latitudes only a little farther South. They may have been people who, like the ancient but unknown Mound-builders in the Southern and Western States of America, had developed a comparatively high civilisation. But one thing is certain, that they must have lived a life wholly different from the life of the Eskimo, and that they must have had completely different habits. Whatever arts the fathers knew, suited to more genial climates, could not fail to be forgotten by the children, in a country where the practice of them was impossible.

The same question, therefore, which Darwin asks in respect to the inhabitants of the extreme south of the American Continent, arises in respect to the inhabitants of its extreme north—What can have induced any people to travel along that Continent in a direction more and more inhospitable, and at last to settle in a country where nearly one-half the year is night, and where, even during the short summer, both Sea and Land are mainly occupied by ice and snow?

But, again, we are reminded that there are other cases of a similar kind. The African Continent does not extend so far south as to reach a severe southern latitude. In that Continent, accordingly, beyond the frequent occurrence of deserts, there is nothing seriously to impede the migrations of Man from its northern towards its southern extremity; nor is there anything there to subject them when they had reached it to the worst conditions. Accordingly we do not find that the predominant native races of Southern Africa rank low in the scale of humanity. Those among them, however, which are or were the lowest in that scale, were precisely those who occupied the most unfavourable portion of the country and are known as Bushmen. Of these it is well ascertained that they are not a distinct race, but of kindred origin with the Hottentots, who were by no means so degraded. On the whole, therefore, the question how men could ever have been induced to live where we actually find them, does not press for an answer so much in respect to any part of the Continent of Africa, with the exception of a few tribes whose present habitat is exceptionally unfavourable.

There is, however, another case of difficulty in respect to the distribution of Mankind, which in some respects is even more remarkable than the case of the Fuegians, or the case of the Eskimo.

We have seen that the great Asiatic Continent, though it does not itself extend beyond latitudes which are favourable to human settlement, is practically prolonged through a continuous chain of Islands into the regions of Australasia. Every part of those regions was found to be inhabited when they were discovered by civilised Man; and it is universally admitted that the natives of Australia, and the natives of Tasmania, are or were (for the Tasmanians are now extinct) among the very lowest of all the families of Man. Now the physical conditions of the great Islands of Australasia are in many respects the most remarkable on the surface of the Globe. Their peculiar fauna and flora prove them to be of great antiquity as Islands in the geological history of the Earth. That is to say—their beasts, and their birds, and their vegetation are so widely separate from those of all other regions, that during long ages of the total time which has elapsed since they first appeared above the Ocean, they must have been as separate as they are now from all other habitable lands. Their beasts are, indeed, related — closely related — to Forms which have existed during certain epochs in many other portions of the Earth's surface. But those epochs are so distant, that we are carried back in our search for creatures like them to the times of the Secondary Rocks—to the horizon of the Oolite.

Speaking of the poverty and of the extremely isolated character of the Australian Mammalia, Mr. Wallace says: "This class affords us the most certain proofs that no part of the country has been united to the Asiatic continent since the latter part of the Mesozoic period of geology."* Of the vast series of creatures which elsewhere have been created, or born, or developed, since that epoch, including all the higher members of the Mammalian Class, not one existed in Australasia until they were introduced by Europeans. Among the grasses there were none which by cultivation could be developed into Cereals. Among the beasts there was not one which was capable of domestication. There were no Apes or Monkeys; no Oxen, Antelopes, or Deer; no Elephants, Rhinoceroses, or Pigs; no Cats, Wolves, or Bears; none even of the smaller Civets or Weasels; no Hedgehogs or Shrews; no Hares, Squirrels, or Porcupines, or Dormice."† There was not even a native Dog; and the only approach to, or representative of, that wonderful animal, was a low Marsupial beast, which is a mere biting machine, incapable of affection for a master, and incapable even of recognising the hand that feeds it. In the whole of Australia, with the exception of a few Mice, there was not one single Mammal which did not belong to this low Marsupial Class, whilst

* Australasia, by Alfred R. Wallace, p. 51. † Ibid.

some others belonged to a class still lower in the scale of organisation, the class called Monotremita. Strange Forms astonished our first explorers, such as the Ornithorhynchus and the Echidna—Forms which combined features elsewhere widely separated in the animal kingdom—the bills of Birds, the spines of Porcupines, the fur of Otters, and the feet of Moles. Nothing analogous to these relics of an extinct fauna had been known to survive in any other part of the world.

Yet in the midst of this strange assemblage of creatures, without any representative of the animals which elsewhere surround him, the familiar Form of Man was found, low, indeed, in his condition, but with all the inalienable characteristics of his race. It is true, that everywhere the gap which separates Man from the lower animals is enormous. Nothing bridges, or comes near to bridging it. It is a gap which has been well called a gulf. But in Australasia the breadth and depth of this gulf is rendered more conspicuous by the association of Man with a series of animals absolutely wanting in those higher members of the Mammalian Class which elsewhere minister to his wants, and the use of which is among the first elements of a civilised condition. Alone everywhere, and separate from other Beings, Man is most conspicuously alone in those strange and distant lands where his high

Organisation is in contact with nothing nearer to itself than the low Marsupial brain.

To those who connect the origin of Man with the theory of Development or Evolution, in any shape or in any form, these peculiar circumstances respecting the fauna of Australasia indicate beyond all doubt that Man is not there indigenous. They stamp him as an immigrant in those regions—a wanderer from other lands. Nor will this conclusion be less assuredly held by those who believe that in some special sense Man has been created. There is something more than an incongruity in supposing that there was a separate Tasmanian Adam. The belief that the creation of Man has been a special work is not inconsistent with the belief that in the time, and in the circumstances, and in the method of this work, it had a definite relation to the previous course and history of Creation—so that Man did not appear until all these lower animals had been born, which were destined to minister to his necessities, and to afford him the means and opportunities for that kind of development which is peculiarly his own. On the contrary, this doctrine of the previous creation of the lower animals, which is, perhaps, more firmly established on the facts of science than any other respecting the origin of Man, is a doctrine fitting closely into the fundamental conceptions which

inspire the belief that Man has been produced by operations as exceptional as their result. And so it is, that when we see men inhabiting lands destitute of all the higher Mammalia, which are elsewhere his servants or companions—destitute even of those productions of the vegetable kingdom, which alone repay the cultivation of the soil, we conclude with certainty that he is there a wanderer from some distant lands, where the work of creation had been carried farther, and where the provisions of surrounding Nature were such as to afford him the conditions of a home.

We see, then, that the question asked by Mr. Darwin, in respect to the Fuegians, is a question arising equally in respect to all the races who inhabit regions of the Globe, which from any cause present conditions highly unfavourable to Man. Just as Mr. Darwin asked, what could have induced tribes to travel down the American Continent to a climate so rigorous as Cape Horn?—just as we have asked, on the same principle, what could have induced men to travel along the same Continent in an opposite direction till they reached and settled within the Arctic Circle?—so now we have to ask, what could have induced men to travel from Asia, or from the rich and splendid Islands of the Eastern Archipelago, and to take up their abode in Australasia?

In every one of these cases the change has been greatly for the worse. It has been a change not only involving comparative disadvantages, but positive disabilities — affecting the fundamental elements of Civilisation, and subjecting those who underwent that change to deteriorating influences of the most powerful kind.

It follows from these considerations as a necessary consequence that the present condition of the Australian, or the recent condition of the Tasmanian, cannot possibly be any trustworthy indication of the condition of their ancestors, when they lived in more favoured regions. The same argument applies to them which, as we have seen, applies to the Fuegians and the Eskimo. If all these families of Mankind are the descendants of men, who at some former time inhabited countries wholly different in climate, and in productions, and in all the facilities which these afford for the development of the special faculties of the race, it is in the highest degree improbable that a change of habitat so great should have been without a corresponding effect upon those over whom it passed. Nor is it a matter of doubt or mere speculation that this effect must have been in the highest degree unfavourable. The conclusion, therefore, to which we are led is, that such races as those which inhabit Australasia, are indeed the results of Development, or of Evolu-

tion—but of the development of unfavourable conditions, and of the evolution of the natural effects of these. Instead of assuming them to be the nearest living representatives of Primeval Man, we should be more safe in assuming them to represent the widest departure from that earliest condition of our race which, on the theory of Development, must of necessity have been associated at first with the most highly favourable conditions of external Nature.

Of one thing, at least, we may be tolerably certain respecting the causes which have led to this extreme dispersion of Mankind to inhospitable regions, at a vast distance from any possible centre of their birth. The first Fuegian was not impelled to Cape Horn by the same motives which impelled Mr. Darwin to visit that country in the *Beagle*. The first Eskimo, who wintered on the shores of Baffin's Bay, was not induced to do so for the same reasons which led to the expeditions of Back, of Franklin, or of Rae. The first inhabitants of Australasia did not voyage there under conditions similar to those which attended the voyages of Tasman or of Cook. We cannot suppose that those distant shores were first colonised by men possessed with the genius, and far advanced in the triumphs of modern Civilisation. Still less can we suppose that they went there under the influence of that last development of Man's intellectual nature,

which leads him to endure almost any suffering in the cause of purely scientific investigation.

Nor is this the only solution of the difficulty which seems to be absolutely excluded by the circumstances of the case. Within the historical period, and in the dim centuries which lie immediately beyond it, we know that many lands have been occupied by conquering races coming from a distance. Sometimes they came to subdue tribes which had long preceded them in occupation, but which were ruder, as well as weaker, than themselves. Sometimes, as in the case of the northern nations bursting in upon the Roman Empire, they came to overthrow a Civilisation which had once been, and in many ways still was, much higher than their own, but which the progress of development in a wrong direction had sunk in degradation and decay. Sometimes they came simply to colonise new lands, at least as favoured, and generally much more favoured, than their own—bringing with them all the resources of which they were possessed—their flocks and herds, their women and children, as well as their warriors with chariots and horses. Such was the case with some of those nations which at various times have held their sway from Central Asia into Eastern and Central Europe. They were nations on the march. But no movement of a like kind has taken place for many centuries.

Lastly, we have the emigrations of our own day, when civilised men, carrying with them all the knowledge, all the requirements, and all the materials of an advanced Civilisation, have landed in countries which by means of these could be made fit for settlement, and could be converted into the seats of agriculture and of commerce.

Not one of these cases can reasonably be supposed to have been the case of the first arrival of Man in Australasia. The natural disadvantages of the country, as compared with the richness and abundance of the regions from which he must have come, or which were on his southward line of march, preclude the supposition that men were attracted to it by natural objects of desire. We know by experience that if the first settlers had been in a condition to bring with them the higher animals which abound in Asia, these animals would have flourished in Australia as they now do. And so also, with reference to the Cereals—if these had ever been introduced, the modern Australians would not have been wholly without them, and would not have been compelled to live so much on the lowest kinds of animal and vegetable food,—on fish, lizards, grubs, snakes, and the roots of ferns.

There is, however, one answer to Mr. Darwin's question, which satisfies all the conditions of the case. There is one explanation, and only one, of

the dispersion of the human race to the uttermost extremities of the habitable Globe. The secret lies in that great law which Malthus was the first to observe and to establish—the law, namely, that population is always pressing on the limits of subsistence. There is a constant tendency to multiplication beyond those limits. And, among the many consequences of this tendency, the necessity of dispersion stands first and foremost. It is true, indeed, that under some conditions, such as those which have been already indicated, the most energetic races, or the most energetic individuals, have been those who moved. But under many other conditions the advantage has been in favour of those who stayed. Quarrels and wars between tribe and tribe, induced by the mere increase of numbers, and by consequent pressure upon the means of living, have been always, ever since Man existed, driving the weaker individuals and the weaker families farther and farther from the original settlements of Mankind.

Then one great argument remains. In the nature of things the original settlements of Man must of necessity have been the most highly favoured in the conditions he requires. If, on the commonly received theory of Development, those conditions produced him, they must have reached, at the time when, and in the place where he arose, the very

highest degree of perfect adaptation. He must have been happy in the circumstances in which he found himself placed, and presumably he must have been contented to remain there. Equally on the theory of Man being a special creation, we must suppose that when weakest and most ignorant he must have been placed in what was to him a garden—that is to say, in some region where the fruits of the Earth were abundant and easily accessible. Whether this region were wide or narrow, he would not naturally leave it except from necessity. On every possible supposition, therefore, as to the origin of Man, those who in the dispersion of the race were first subjected to hard and unfavourable conditions would naturally be those who had least strength to meet them, and upon whom they would have accordingly the most depressing effect. This is a process of Natural Rejection which is the inseparable correlative of the process of Natural Selection. It tends to development in a wrong direction by the combined action of two different circumstances which are inherent in the nature of the case. First, it must be always the weaker men who are driven out from comfortable homes; and, secondly, it must be always to comparatively unfavourable regions that they are compelled to fly. Under the operation of causes so combined as these, it would be strange,

indeed, if the physical and mental condition of the tribes which have been exposed to them should remain unchanged. It is true, indeed, that adverse conditions, if they be not too severe, may develop energy, and result in the establishment of races of special hardihood. And in many cases this has been the actual result. But, on the other hand, if physical conditions be as insuperable as those which prevail in Tierra del Fuego or in Baffin's Bay; or if, though less severe than these, they are nevertheless too hard to be overcome by the resources at the disposal of the men who are driven to encounter them, then the battle of life becomes a losing one. Under such circumstances, degradation is unavoidable. As surely as the progress of Man is the result of Opportunity, that is to say, as surely as it is due to the working of his faculties under stimulating and favouring conditions, so surely must he descend in the scale of Intelligence and of culture, when that opportunity is taken from him, and when these faculties are placed under conditions where they have no call to work.

It is, then, easy to see some at least of the external circumstances which, first, in the natural course of things, would bring an adverse influence to bear upon Mankind. Here we are on firm ground, because we know the law from which comes the necessity of migrations, and the force

which has propelled successive generations of men farther and farther in ever-widening circles round the original centre or centres of their birth. Then, as it would be always the feebler tribes which would be driven from the ground which has become overstocked, and as the lands to which they went forth were less and less hospitable in climate and productions, the struggle for life would be always harder. And so it would generally happen, in the natural course of things, that the races which were driven farthest would become the rudest and the most engrossed in the pursuits of mere animal existence.

Accordingly, we find that this key of principle fits into and explains many of those facts in the distribution and condition of Mankind, which, in the case of the Fuegians, excited the wonder and curiosity of Darwin. In the light of this explanation, these facts seem to take form and order. It is a fact that the lowest and rudest tribes in the population of the Globe have been found, as we have seen, at the farthest extremities of its larger Continents, or in the distant Islands of its great Oceans, or among the hills and forests which in every land have been the last refuge of the victims of violence and misfortune. Those extreme points of land which in both hemispheres extend into severe latitudes are not the only portions of the

Globe which are highly unfavourable to Man. There are other regions quite as bad, if not, in some respects, even worse. In the dense, uniform, and gloomy forests of the Amazon and Orinoco there are tribes which seem to be among the lowest in the world. It cannot be unconnected with the savagery of the condition to which they have been reduced that we find the remarkable fact that all those regions of Tropical America are wholly wanting in the animals which are capable of domestication, and which are inseparable from the earliest traces of human culture. The Ox, the Horse, and the Sheep are all absent—even as regards the genera to which they belong. There are indeed the Tapir, the Paca, and the Curassow Turkey, and all these are animals which can be tamed. But none of them will breed in confinement, and the races cannot be established as useful servants of Mankind. In contrast with these and with other insuperable disadvantages of men driven into the forests of Tropical America, it is instructive to observe that the same races, where free from these disadvantages, were never reduced to the same condition. In Peru the Indian races had the Llama, and had also an advanced Civilisation.* In India, too, it is always the Hill Tribes who furnish the least favourable specimens of our race. But in every one of these

* "Naturalist on the Amazons," Bates, vol. i. p. 191-3.

cases we have the presence of external circumstances and physical conditions which are comparatively unfavourable. It is quite certain that these conditions must have had their own effect. It is equally certain that the races which have been subject to them for a long and indefinite time must have been once under the influence of conditions much more favourable; and the inevitable conclusion follows, that the savagery and degradation of their existing state is to a great extent the result of development in a wrong direction.

There are other arguments all pointing the same way, the force of which cannot be fully estimated, except by those who are familiar with some of the fundamental conceptions which seem to rise unbidden in the mind from the facts which geology has revealed touching the history of Creation. One of these facts is that each new Organic Form, or each new variety of birth, seems always to have been introduced with a wonderful energy of life. It is needless to repeat that this fact stands in close connection with every possible theory of Evolution. If these new Forms were the product of favouring conditions, the prevalence of these conditions would start them with force upon their way. The initial energy would be great. Where every condition was favourable—so favourable indeed that the new birth is assumed to have been nothing but their

natural result—then the newly-born would be strong and lusty. And such, accordingly, is the fact in that record of Evolution or of Creation which Palæontology affords. The vigour which prevails in the youth of an individual is but the type of the vigour which has always prevailed in new and rising species. All the complex influences which led to their being born, led also to their being fat and flourishing. That which caused them to arise at all must have had the effect of causing them to arise in strength. The condition of all the lowest races of men is in absolute contrast with everything which this law demands. Everywhere, and in everything, they exhibit all the characteristics of an energy which is spent—of a force which has declined—of a vitality which has been arrested. In numbers they are stationary, or dwindling; in mind they are feeble and uninventive; in habits they are stupid or positively suicidal.

It is another symptom of a wrong development being the real secret of their condition that the lowest of them seem to have lost even the power to rise. Though individually capable of learning what civilised men have taught them, yet as races they have been invariably scorched by the light of Civilisation, and have withered before it like a plant whose roots have failed. The power of assimilation seems to have departed, as it always does depart

from an Organism which is worn out. This has not been the result with races which, though very barbarous, have never sunk below the pastoral or the agricultural stage. It is remarkable that the Indian races of North America are perhaps the highest which have exhibited this fatal and irredeemable incapacity to rise: and it is precisely in their case that we have the most direct evidence of degradation by development in a wrong direction. There are abundant remains of a very ancient American Civilisation, which was marked by the construction of great public works and by the development of an agriculture founded on the Maize, which is a cereal indigenous to the Continent of America. This Civilisation was subsequently destroyed or lost, and then succeeded a period in which Man relapsed into partial barbarism. The spots which had been first forest, then, perhaps, sacred monuments, and thirdly, cultivated ground, relapsed into forest once more.* So strong is this evidence of degradation having affected the population of a great part of the American Continent, that the distinguished author from whom these words are quoted, and who generally represents the Savage as the nearest living representative of primeval Man, is obliged to ask, "What fatal cause destroyed this earlier civilisation? Why were these

* Lubbock, "Prehistoric Times," p. 234.

fortifications forsaken—these cities in ruins? How were the populous nations which once inhabited the rich American valleys reduced to the poor tribes of savages whom the European found there? Did the North and South once before rise up in arms against one another? Did the terrible appellation, the 'Dark and Bloody Land,' applied to Kentucky, commemorate these ancient wars?"* Whatever may have been the original cause, the process of degradation has been going on within the historic period. When Europeans first came in contact with the Indian tribes, there was more agriculture among them than there is now. They have long descended to the condition of pure hunters. The most fundamental of all the elements of a civilised and settled life—the love and practice of agriculture—has been lost. Development in the wrong direction had done its work. There is no insoluble mystery in this result. It is, in all probability, if indeed it be not certainly, attributable to one cause, that of internecine and devastating wars. And these again are the result of a natural and universal instinct which has its own legitimate fields of operation, but which like all other human instincts is liable to degenerate into a destructive passion. The love of dominion is strong in all men, and it has ever been strongest in the strongest races.

* Lubbock, "Prehistoric Times," p. 236.

But the love of fighting and of conquest very often sinks into a mere lust of blood. The natural rivalry of different communities may become such implacable hatred as to be satisfied with nothing short of the extermination of an enemy. Inspired by this passion, particular races or tribes have sometimes acquired a power and a ferocity in fighting, against which other tribes of a much higher character and of a much more advanced civilisation have been unable to contend.

This is no fancy picture. It is a mistake to suppose that the decline of Civilisation in the American Continent has been due to the invasion of it by Europeans since the discovery of Columbus. Just as the older civilisation of that Continent was an indigenous Civilisation founded on the cultivation of a cereal peculiar to America, so also does the decay and loss of this Civilisation seem to have been a purely indigenous decay. Mr. Wilson, in his very interesting work on "Prehistoric Man," gives an account of the process by which barbarism has been actually seen extending among the Red Indian tribes. When the valley of the St. Lawrence first came under the observation of Europeans, some of those tribes were found to be leading a settled life, practising agriculture, and constituting communities in possession of all the elements of a Civilisation fairly begun, or probably long inherited.

The destruction of these communities was effected by the savage hostility of one or two particular tribes, such as the Iriquois and the Mohawks. In these tribes the lust of blood had been developed into an absorbing passion, so that their very name became a terror and a scourge. Wholly given up to war as a pursuit, their path was red with blood, and the more peaceful and civilised branches of the same stock were driven, a scanty remnant, into forests and marshes, where their condition was necessarily reduced to that of Savages, living wholly by the chase. It is a curious and instructive fact that this sequence of events was so vividly and painfully remembered among some of the Red Indian tribes that it had become embodied in a religious myth. It was said that in old times the Indians were increasing so fast that they were threatened with want, and that the Great Spirit then taught them to make war, and thus to thin one another's numbers.* Although this myth stands in very close connection with the universal tradition of a Golden Age, or of a Past in some measure better than the Present, it is remarkable on account of the specific cause which he assigns for deterioration and decay, a cause in respect to which we have historical evidence of its actual effects.

When the great French navigator, Cartier,

* "Fossil Men," Principal Dawson, p. 47. Montreal, 1880.

first explored the St. Lawrence in 1534–35, he ascended to that point of its course whence the City of Montreal now looks down upon its vast and splendid prospect of fertile lands and of rushing waters. He found it occupied by the Indian town of Hochelaga—inhabited by a comparatively civilised people, busy not only in fishing or in hunting, but also in a successful husbandry. The town was strongly fortified, and it was surrounded by cultivated ground. Within one hundred and seven years—some time between 1535 and 1642—Hochelaga had utterly disappeared, with all its population, and all its culture. It had been destroyed by wars, and its site had returned to forest or to bush. To this day when men dig the foundations of new houses in Montreal they dig up the flint implements of the Hochelagans, which, although about 350 years old, may now be reckoned by the scientific anthropologist as relics of the "Stone Age,"* and of an ancient universal savagery. The same course of things prevailed over the greater part of Canada. During the first half of the seventeenth century a large part of the valley of the St. Lawrence, and vast tracts of country on both shores of the great Lakes, are known to have been devastated by exterminating wars. In 1626 a Jesuit missionary penetrated into the settlement of a tribe called the

* "Fossil Men," Principal Dawson, pp. 29–42. Montreal, 1880.

Attiwenderonks. He found them inhabiting towns and villages, and largely cultivating Tobacco, Maize, and Beans. The country inhabited by the tribe which has left its name in Lake Erie, is stated to have been greatly more extensive, and is everywhere covered with the marks of a similar stage of civilisation. Within less than thirty years later another missionary found the whole of the regions a silent desert. In like manner the country round Lake Huron was, at the same period of time, seen to be full of populous villages defended by walls, and surrounded by cultivated fields. But the same fate befell them.* They were extirpated by the Mohawks.

Here then we see in actual operation, within very recent times, a true cause—which is quite capable of producing the effects which, by some means or another, have certainly been produced—and that, too, on the largest scale—upon the American Continent. It is a cause arising out of the corruption of human nature, that is to say, out of one of the universal instincts of Mankind, developed in such excess as to become a destructive mania. Many nations most highly civilised have been extremely warlike—and the ambition they have cherished of subduing other nations has been the means of extending over the world their own knowledge of the arts of government, and their own high attain-

* "Prehistoric Man," Dan. Wilson, pp. 359-60.

ments in the science of jurisprudence. But when the same passion takes possession of ruder men, and is directed by irrational antipathies between rival families and rival tribes, it may be, and has often been, one of the most desolating scourges of humanity. In itself an abuse and a degradation which none of the lower animals exhibit, it tends always to the evolution of further evils, to the complete destruction of civilised communities, or to the reduction of their scanty remnants to the condition and the habits of savage life.

It results from these facts and considerations, gathered over a wide field of observation and experience, that the processes of Evolution and Development as they work in Man, lead to consequences wholly different from those to which they lead in other departments of Creation. There, they tend always in one of two directions, both of which are directions predetermined and in perfect harmony with the Unity of Nature. One of these directions is that of perfect success, the other of these directions is that of speedy extinction. Among the lower animals, when a new Form appears, it suits exactly its surrounding conditions; and when it ceases to do so it ceases to survive. Or if it does survive it lives by change, by giving birth to something new, and by ceasing to be identical with its former self. So far as we can

actually see the past work of Development among the beasts, it is a work which has always led either to rapid multiplication or to rapid extinction. There is no alternative. But in Man the processes of Evolution lead in a great variety of directions—some of them tending more or less directly to the elevation of the creature, but others of them tending very speedily and very powerfully to its degradation. In some men they have led to an intellectual and moral standing, of which we can conceive it to be true that it is only a "little lower than the Angels." In others they have ended in a condition of which it is too evidently true that it is a great deal lower than the condition of the Beasts.

We can get, however, a great deal nearer towards the understanding of this anomaly than the mere recognition of it as a fact. Hitherto we have been dealing only with one of the two great causes of change—namely, that of unfavourable external or physical conditions. Let us now look at the other—namely, the internal nature and character of Man. We can see how it is that, when working under certain conditions, the peculiar powers of Man must lead to endless developments in a wrong direction. Foremost among these powers is the gift of Reason. I speak here of Reason not as the word is often used, to express a great variety of powers, but as applied to the logical Faculty alone. In this

restricted sense, the gift of Reason is nothing more than the gift of seeing the necessity or the natural consequences of things—whether these be things said or things done. It is the Faculty by which, consciously or unconsciously, we go through the mental process expressed in the word "therefore." It is the Faculty which confers on us a true gift of Prophecy—the power of foreseeing that which "must shortly come to pass." In its practical application to conduct, and to the affairs of life, it is the gift by which we see the means which will secure for us certain ends, whether these ends be the getting of that which we desire, or the avoiding of that which we dread. But in its root, and in its essence, as well as in its application to the abstract reasoning of mathematics, it is simply the faculty by which we see one proposition as involving, or as following from another.

The power of such a Faculty obviously must be, as it actually is, immeasurable and inexhaustible, because there is no limit to this kind of following. That is to say, there is no end to the number of things which are the consequence of each other. Whatever happens in the world is the result of causes, moral or material, which have gone before, and this result again becomes the cause of other consequences, moral or material, which must follow in their turn. It is a necessary result of the Unity of Nature, and

of the Continuity of things, that the links of consequence are the links of an endless chain. It is the business of Reason to see these links as they come one by one gradually into view; and it is in the nature of a reasoning creature to be drawn along by them in the line, whatever it may be, which is the line of their direction. The distance which may be traversed in following that direction even for a short time, and by a single mind, is often very great —so great that a man may be, and often is, a different Being from himself, both in opinions and in conduct, at two different epochs of his life. There are, indeed, individuals, and there are times and conditions of society, in which thought is comparatively stagnant, when it travels nowhere, or when its movements are so slow and gradual as to be imperceptible. But, on the other hand, there are times when Mind is on the march. And then it travels fast and far. The journey is immense indeed, which may be accomplished by a few successive generations of men following, one after the other, the links of consequence. At the end of such a journey, the children may be separated from their fathers by more than the breadth of Oceans. They may have passed into new regions of thought and of opinion, of habit and of worship. If the movement has been slow, and if the time occupied has been long, it will be all the more difficult to retrace

the steps by which the change has been brought about. It will appear more absolute and complete than it really is—the new regions of thought being in truth connected with the old by a well-beaten and continuous track.

But these endless processes of Development arising out of the operation of the Reasoning Faculty, are consistent with any result — good or bad. Whether the great changes they produce have been for the better or for the worse, must depend, not on the length of the journey, but on the original direction in which it was begun. It depends on whether that direction has been right or wrong—on whether the road taken has been the logical development of a truth, or the logical development of a lie. The one has a train of consequences as long and as endless as the other. It is the nature of the Reasoning Faculty that it works from data. But these data are supplied to it from many different sources. In the processes of reasoning on which the abstract sciences depend, the fundamental data are axioms or self-evident propositions. These may, in a sense, be said to be supplied by the Reasoning Faculty itself, because the recognition of a truth as self-evident is in itself an exercise of the Reasoning Faculty. But in all branches of knowledge, other than the abstract sciences, that is to say, in every department of thought which most

nearly concerns our conduct and our beliefs, the data on which Reason has to work are supplied to it from sources external to itself. In matters of Belief, they come, for the most part, from Authority, in some one or other of its many forms, or from Imagination working according to its own laws upon impressions received from the external world. In matters of conduct, the data supplied to Reason come from all the innumerable motives which are founded on the desires. But in all these different provinces of thought it is the tendency and the work of Reason to follow the proposition, or the belief, or the motive, to all its consequences. Unless, therefore, the proposition is really as true as it seems to be; unless the belief is really according to the fact; unless the motive is really legitimate and good, it is the necessary effect of the logical Faculty to carry men farther and farther into the paths of error, until it lands them in depths of degradation and corruption of which unreasoning creatures are incapable.

It is astonishing how reasonable—that is to say, how logical—are even the most revolting practices connected, for example, with religious worship or religious customs, provided we accept as true some fundamental conception of which they are the natural result. If it be true that the God we worship is a Being who delights in suffering, and takes pleasure, as it were, in the very

smell of blood, then it is not irrational to appease Him with hecatombs of human victims. This is an extreme case. There are, however, such cases, as we know, actually existing in the world. But, short of this, the same principle is illustrated in innumerable cases, where cruel and apparently irrational customs are in reality nothing but the logical consequences of some fundamental Belief respecting the nature, the character, and the commands of God. In like manner, in the region of morals and of conduct not directly connected with religious Beliefs, Reason may be nothing but the servant of Desire, and in this service may have no other work to do than that of devising means to the most wicked ends. If the doctrine given to Reason be the doctrine that pleasure and self-indulgence, at whatever sacrifice to others, are the great aims and ends of life, then Reason will be busy in seeking out "many inventions" for the attainment of them, each invention being more advanced than another in its defiance of all Obligation and in its abandonment of all sense of duty. Thus the development of selfishness under the guidance of faculties which place at its command the great powers of foresight and contrivance, is a kind of development quite as natural and quite as common as that which constitutes the growth of knowledge and of virtue. It is indeed a development which, under the condition supposed—

that is to say, the condition of false or erroneous data supplied to the Reasoning Faculty—is not an accident or a contingency, but a necessary and inevitable result.

And here there is one very curious circumstance to be observed, which brings us still closer to the real seat of the anomaly which makes Man in so many ways the one great exception to the Order of Nature. That circumstance is the helplessness of mere Reason to correct the kind of error which is most powerful in vitiating conduct. In those processes of abstract Reason which are the great instruments of work in the exact sciences, the Reasoning Faculty has the power of very soon detecting any element of error in the data from which it starts. That any given proposition leads to an absurd result, is one of the familiar methods of disproof in mathematics. That one of only two possible alternatives is proved to be absurd, is conclusive demonstration that the other must be true. In this way Reason corrects her own operations, for the Faculty which recognises one proposition as evidently absurd, is the same Faculty which recognises another proposition as evidently true. It is, indeed, because of its contradicting something evidently true, or something which has been already proved to be true, that the absurd result is seen to be absurd. It is in this way that, in the exact sciences,

erroneous data are being perpetually detected, and the sources of error are being perpetually eliminated. But Reason seems to have no similar power of detecting errors in the data which are supplied to it from other departments of thought. In the developments, for example, of social habits, and of the moral sentiments on which these principally depend, no results, however extravagant or revolting, are at all certain of being rejected because of their absurdity. Among men we see it to be a fact that no practice however cruel, no custom however destructive, is sure on account of its cruelty or of its destructiveness to be at once detected and rejected as self-evidently wrong. Reason works upon the data supplied to it by superstition, or by selfish passions and desires, apparently without any power of questioning the validity of those data, or, at all events, without any power of immediately recognising even their most extreme results as evidently false. In Religion, at least, it would almost seem as if there were no axiomatic truths which are universally, constantly, and instinctively present to the Mind—none, at least, which are incapable of being obscured—and which, therefore, inevitably compel it to revolt against every course or every belief inconsistent with them. It is through this agency of erroneous Belief that the very highest of our faculties, the Sense of Obligation, may and does become itself the most powerful of all agents in the development

of evil. It consecrates what is worst in our own nature, or whatever of bad has come to be sown in the multitudinous elements which that nature contains. The consequence is, that the gift of Reason is the very gift by means of which error in Belief, and vice in Character, are carried from one stage of development to another, until at last they may, and they often do, result in conditions of life and conduct removed by an immeasurable distance from those which are in accordance with the order and with the analogies of Nature.

These are the conditions of life, very much lower, as we have seen, than those which prevail among the Brutes, which it is now the fashion to assume to be the nearest type of the conditions from which the Human Race began its course. They are, in reality and on the contrary, conditions which could not possibly have been reached except after a very long journey. They are the goal at which men have arrived after running for many generations in a wrong direction. They are the result of Evolution —they are the product of Development. But it is the evolution of germs whose growth is noxious. It is the development of passions and desires, some of which Man possesses in common with the Brutes, others of which are peculiar to himself, but all of which are in him freed from the guiding limitations which in every other department of Nature prevail

among the motive forces of the world, and by means of which alone they work to order.

It is in the absence of these limitations that what is called the Free Will of Man consists. It is not a freedom which is absolute and unconditional. It is not a freedom which is without limitations of its own. It is not a freedom which confers on Man the power of acting except on some one or other of the motives which it is in his nature to entertain. But that nature is so infinitely complex, so many-sided, is open to so many influences, and is capable of so many movements, that practically their combinations are almost infinite. His freedom is a freedom to choose among these motives, and to choose what he knows to be the worse instead of the better part. This is the freedom without which there could be no action attaining to the rank of Virtue; and this also is the freedom in the wrong exercise of which all Vice consists.

There is no theoretical necessity that along with this freedom there should be a propensity to use it wrongly. It is perfectly conceivable that such freedom should exist, and that all the desires and dispositions of men should be to use it rightly. Not only is this conceivable, but it is a wonder that it should be otherwise. That a Being with powers of Mind and capacities of enjoyment rising high above those which belong to any other creature, should,

alone of all these creatures, have an innate tendency to use his powers, not only to his own detriment, but even to his own self-torture and destruction, is such an exception to all rule, such a departure from all Order, and such a violation of all the Reasonableness of Nature, that we cannot think too much of the mystery it involves. It is possible that some light may be thrown upon this mystery by following the facts connected with it into one of the principal fields of their display—namely, the History of Religion. But this must form the subject of another chapter.

CHAPTER XI.

On the Nature and Origin of Religion.

IF any one were to ask what is the origin of hunger or what is the origin of thirst, the idleness of the question would be felt at once. And yet hunger and thirst have had an origin. But that origin cannot be separated from the origin of Organic Life. and the absurdity of the question lies in this—that in asking it, the possibility of making such a separation is assumed. It involves either the supposition that there have been living creatures which had no need of food and drink, or else the supposition that there have been living creatures which, having that need, were nevertheless destitute of any corresponding appetite. Both of these suppositions, although not in the abstract inconceivable, are so contrary to all that we know of the laws of Nature, that practically they are rejected as impossible. There always

is, and there always must be, a close correspondence between the intimations of Sensibility and the necessities of Life. Hunger is the witness in sensation to the law which demands for all living things a renewal of Force from the assimilation of external matter. To theorise about its origin is to theorise about the origin of that law, and consequently about the origin of embodied Life. The Darwinian formula is not applicable here. Appetite cannot have arisen out of the accidents of variation. It must have been coeval with Organisation, of which it is a necessary part. The same principle applies to all elementary appetites and affections, whether they be the lower appetites of the Body or the higher appetites of the Mind. They exist because of the co-existence of certain facts and of certain laws to which they stand in a relation which is natural and necessary, because it is a relation which is reasonable and fitting. Really to understand how these appetites and affections arose, it would be necessary to understand how all the corresponding facts and laws came to be. But in many cases—indeed in most cases—any such understanding is impossible, because the facts and the laws to which every appetite corresponds are in their very nature ultimate. They are laws behind which, or beyond which, we cannot get. The only true explanation of the appetite lies in the simple recognition of the

Adjusted Relations of which it forms a part; that is to say—in a recognition of the whole System of Nature as a Reasonable System, and of this particular part of it as in harmony with the rest. Any attempted explanation of it which does not start with that recognition of the Reasonableness of Nature must be futile. Any explanation which not only fails in this recognition, but assumes that the origin of anything can be interpreted without it, must be not only futile but erroneous.

Men have been very busy of late in speculating on the origin of Religion. In asking this question they generally make, often as it seems unconsciously, one or other of two assumptions. One is the assumption that there is no God, and that it must have taken a long time to invent Him. The other is that there is a God, but that men were born, or created, or developed, without any sense or feeling of His existence, and that the acquisition of such a sense must of necessity have been the work of time.

I do not now say that either of these assumptions is in itself inconceivable, any more than the supposition that at some former time there were creatures needing food and drink and yet having no appetites to inform them of the fact. But what I desire to point out is, first, that one or other of these assumptions is necessarily involved in most speculations on the subject; and secondly, that, to say the least,

it is possible that neither of these assumptions may be true. Yet the method of inquiry to be pursued respecting the origin of Religion must be entirely different, according as we start from one or other of these assumptions, or as we reject them both. If we assume that there is no God, then the question how Mankind have come so widely to invent one or more of such imaginary Beings, is indeed a question well worthy of our utmost curiosity and research. But on the other hand, if we start with the assumption that there is a God, or indeed if we assume no more than that there are Intelligences in the Universe superior to Man, and possessing some power greater than his own over the Natural System in which he lives, then the method of inquiry into the origin of Religion is immensely simplified. Obviously the question how Man first came to recognise the existence of his Creator, if we suppose such a Being to exist, becomes in virtue of that supposition relegated to the same class as the question how he first came to recognise any other of the facts or truths which it concerns him most to know. Indeed from its very nature this truth is evidently one which might be more easily and more directly made known to him than many others. The existence of a Being from whom our own Being has been derived involves, at least, the possibility of some communication direct or indirect.

Yet the impossibility or the improbability of any such communication is another of the assumptions continually involved in current theories about the origin of Religion. Yet it is quite certain that no such assumption can be reasonably made. The perceptions of the Human Mind are accessible to the intimations of external truth through many avenues of approach. In its very structure it is made to be responsive to some of these intimations by immediate apprehension. Man has that within him by which the Invisible can be seen, and the Inaudible can be heard, and the Intangible can be felt. Not as the result of any reasoning, but by the same power by which it sees and feels the postulates on which all reasoning rests, the Human Mind may from the very first have felt that it was in contact with a Mind which was the fountain of its own.

No argument can be conducted without some assumptions. But neither ought any argument to be conducted without a clear understanding what these assumptions are. Having now cleared up the assumptions which are usually made, we can proceed with greater confidence in the discussion of the great problem before us. The origin of particular systems of religious Belief is, of course, a mere question of fact. A few of these systems belong to our own time ; others have arisen late in the Historic Ages and in the full light of contemporary evi-

dence. Some, again, are first recognised in the dawn of those Ages, and their distinctive features can only be dimly traced through evidence which is scanty and obscure. Religion is the origin of all these systems of Belief, but no one of them represents the origin of Religion. None of them throw any other light on the origin of Religion than as all exhibiting the one essential element in which all Religion consists. And it would be well if men, before philosophising on the origin of Religion, had a more accurate conception of what they mean by it. The definitions of Religion have been even worse than the definitions of Morality. Just as the attempt is made to account for Morals apart from the sense of duty or of Obligation in conduct, so is the attempt made to account for Religion apart from the sense of Mind or Will in Nature. The great effort seems to have been to try how the essential idea of Religion could be either most completely eliminated or else most effectually concealed. For example, a feeling of absolute Dependence has been specified by Schleiermacher as the essence of Religion. Yet it is evident that a sense of absolute Dependence may be urgent and oppressive without the slightest tincture of religious feeling. A man carried off in a flood, and clinging to a log of wood, may have, and must have, a painful sense of absolute dependence on the log. But no one would think

of describing this sense as a feeling of Religion. A Savage may have a feeling of absolute dependence on his bows and arrows, or on the other implements of his chase; or disease may bring home to him a sense of his absolute dependence on the Organs of his own body, which alone enable him to use his weapons with success. But it does not follow that the Savage has any feeling of Religion towards his bow, or his arrow, or his net, or his fish-spear, or even towards his own legs and arms. Any plausibility, therefore, which may attach to the proposition which identifies Religion with the mere sense of Dependence, is due entirely to the fact that when men speak of a sense of Dependence they suggest the idea of a particular kind of dependence —namely, Dependence upon a Being or a Personality, and not Dependence upon a thing. That is to say, that the plausibility of the definition is entirely due to an element of thought which it is specially framed to keep out of sight. A sense of absolute Dependence on purely physical things does not necessarily contain any religious element whatever. But on the other hand, a sense of Dependence on Personal or Living Agencies, whether they are supposed to be supreme or only superior to our own, is a feeling which is essentially religious.* But the

* Professor Tiele's definition of Religion corresponds with that here given :—"The relation between Man and the Superhuman Powers in

element in that feeling which makes it religious is the element of belief in a Being or in Beings who have Power and Will. When we say of any man, or of any tribe of men, that they have no Religion, we mean that they have no belief in the existence of any such Being or Beings, or at least no such belief as to require any acknowledgment or any worship.

The practice of worship of some kind or another is so generally associated with Religion, that we do not usually think of it otherwise than as a necessary accompaniment. It is a natural accompaniment, for the simple reason that in the very act of thinking of Superhuman Beings the Mind has an inevitable tendency to think of them as possessing not only an intellectual but a moral nature which has analogies with our own. It conceives of them as having dispositions and feelings as well as mere Intellect and Will. Complete indifference towards other creatures is not natural or usual in ourselves, nor can it be natural to attribute it to other Beings. In proportion therefore as we ascribe to the Superhuman Personalities, in whose existence we believe, the Authorship or the rule over, or even a mere partnership in, the activities round us, in the same proportion is it natural to regard those Beings as capable of exercising some influence upon us,

which he believes." (Outlines of the History of the Ancient Religions, p. 2.)

whether for evil or for good. This conception of them must lead to worship—that is to say, to the cherishing of some feeling and sentiment in regard to them, and to some methods of giving it expression. There is, therefore, no mystery whatever in the usual and all but universal association of worship of some kind with all conceptions of a religious nature.

It is to be remembered, however, that as a matter of fact, the belief in the existence of a God, or of more Gods than one, has come, though rarely, to be separated from the worship of them. Among speculative philosophers this separation may arise from theories about the Divine nature, which represent it as inaccessible to supplication, or as indifferent to the sentiments of men. Among Savages it may arise from the evolution of decay. It may be nothing but "a sleep and a forgetting"—the result of the breaking up of ancient homes, and the consequent impossibility of continuing the practice of rites which had become inseparably associated with local usages. Among philosophers this divorce between the one essential element of Religion and the natural accompaniments of worship, is well exhibited in the Lucretian conception of the Olympian Gods, as well as in the condition of mind of many men in our own day, who have not rejected the idea of a God, but who do not feel the need of addressing Him in the language

either of prayer or praise. Of this same divorce among Savages we have an example in certain Australian tribes, who are said to have a theology so definite as to believe in the existence of one God, the omnipotent Creator of Heaven and of Earth, and yet to be absolutely destitute of any worship.* Both of these, however, are aberrant phenomena—conditions of mind which are anomalous, and in all probability essentially transitional. It has been shown in the preceding pages how impossible it is to regard Australian or any other Savages of the present time as representing the probable condition of Primeval Man. It needs no argument to prove that it is equally impossible to regard speculative philosophers of any school as representing the mind of the earliest progenitors of our race. But neither of Savages nor of Philosophers who believe in a God but do not pray to Him, would it be proper to say that they have no Religion. They may be on the way to having none, or they may be on the way to having more. But men who believe in the existence of any Personal or Living Agency in Nature superior to our own, are in possession of the one essential element of all Religion. This belief is almost universally associated with practices which are in the nature of

* Hibbert Lectures, by Max Müller, 1878, pp. 16, 17.

worship—with sentiments of awe, or of reverence, or of fear.

It is not inconsistent with this definition to admit that sects or individuals, who have come to reject all definite theological conceptions and to deny the existence of a living God, have, nevertheless, been able to retain feelings and sentiments which may justly claim to be called religious. In the first place, with many men of this kind, their denial of a God is not in reality a complete denial. What they deny is very often only some particular conception of the Godhead, which is involved, or which they think is involved, in the popular theology. They are repelled, perhaps, by the familiarity with which the least elevated of human passions are sometimes attributed to the Divine Being. Or they may be puzzled by the anomalies of Nature, and find it impossible to reconcile them intellectually with any definite conception of a Being who is both all-powerful and all-good. But in faltering under this difficulty, or under other difficulties of the same kind, and in denying the possibility of forming any clear or definite conceptions of the Godhead, they do not necessarily renounce other conceptions which, though vague and indefinite, are nevertheless sufficient to form the nucleus of a hazy atmosphere of religious feeling and emotion. Such men may or may not

recognise the fact that these feelings and emotions have been inherited from ancestors whose beliefs were purely theological, and that it is in the highest degree doubtful how long these feelings can be retained as mere survivals.

It is remarkable that such feelings are even now artificially propped up and supported by a system of investing abstract terms with all the elements of Personality. When men who profess to have rejected the idea of a God declare, nevertheless, as Strauss has declared, that "the world is to them the workshop of the Rational and the Good,"—when they explain that "that on which they feel themselves to be absolutely dependent is by no means a brute power, but that it is Order and Law, Reason and Goodness, to which they surrender themselves with loving confidence," we cannot be mistaken that the whole of this language, and the whole conceptions which underlie it, are language and conceptions appropriate to Agencies and Powers which are possessed of all the characteristics of Mind and Will. Order and Law are, indeed, in some minds associated with nothing except Matter and material Forces. But neither Reason nor Goodness can be thus dissociated from the idea of Personality. All other definitions which have been given of Religion will be found on analysis to borrow whatever strength they have from involving, either expressly

or implicitly, this one conception. Morality, for example, becomes Religion in proportion as all duty and all Obligation is regarded as resting on the sanctions of a Divine Authority. In like manner, Knowledge may be identified with Religion in proportion as all knowledge is summed up and comprehended in the perfect knowledge of One who is All in All. Nor is there any real escape from this one primary and fundamental element of Religion in the attempt made by Comte to set up Man himself—Humanity—as the object of religious worship. It is the Human Mind and Will abstracted and personified that is the object of this worship. Accordingly, in the system of Comte, it is the language of Christian and even of Catholic adoration that is borrowed as the best and fullest expression of its aspirations and desires. Such an impersonation of the Human Mind and Will, considered as an aggregate of the past and of the future, and separated from the individual who is required to worship it, does contain the element, or at least some faint outline and shadow of the one element, which has been here represented as essential to Religion —the element, namely, of some Power in Nature other than mere brute Matter or mere physical Force—which Power is thought of and conceived as invested with the higher attributes of the Human Personality.

Like methods of analysis are sufficient to detect the same element in other definitions of Religion, which are much more common. When, for example, it is said that "the Supernatural" or "the Infinite" are the objects of religious thought, the same fundamental conception is involved, and is more or less consciously intended. The first of these two abstract expressions, "the Supernatural," is avowedly an expression for the existence and the agency of superhuman Personalities. It is objectionable only in so far as it seems to imply that such agency is no part of "Nature." This is in one sense a mere question of definition. We may choose to look upon our own human agency as an agency which is outside of Nature. If we do so, then, of course, it is natural to think of the agency of other Beings as outside of Nature also. But, on the other hand, if we choose to understand by "Nature" the whole System of things, visible and invisible, in which we live and of which we form a part, then the belief in the agency of other Beings of greater power, does not necessarily involve any belief whatever that they are outside of that System. On the contrary, the belief in such an agency may be identified with all our conceptions of what that System as a whole is, and especially of its Order and its Intelligibility. Whilst therefore, "the Supernatural," as commonly understood, gives a true indication of the only real

objects of religious thought, it complicates that indication by coupling the idea of Living Agencies above our own with a description of them which at the best is irrelevant, and is very apt to be misleading. The question of the existence of Living Beings superior to Man, and having more or less power over him and over his destinies, is quite a separate question from the relation in which those Beings may stand to what is commonly but variously understood by "Nature."

The other phrase, now often used to express the objects of religious thought and feeling, "the Infinite," is a phrase open to objection of a very different kind. It is ambiguous, not merely as "the Supernatural" is ambiguous, by reason of its involving a separate and adventitious meaning besides the meaning which is prominent and essential; but it is ambiguous by reason of not necessarily containing at all the one meaning which is essential to Religion. "The Infinite" is a pure and bare abstraction, which may or may not include the one only object of religious consciousness and thought. An Infinite Being, if that be the meaning of "the Infinite," is, indeed, the highest and most perfect object of Religion. But an infinite space is no object of religious feeling. An infinite number of material units is no object of religious thought. Infinite time is no object of religious thought. On the other hand,

infinite Power not only may be, but must be, an object of religious contemplation in proportion as it is connected with the idea of Power in a living Will. Infinite Goodness must be the object of religious thought and emotion, because in its very nature this conception involves that of a Personal Being. But if all this is what is intended by "the Infinite," then it would be best to say so plainly. The only use of the phrase, as the one selected to indicate the object of Religion, is that it may be understood in a sense that is kept out of sight. And the explanations which have been given of it are generally open to the same charge of studied ambiguity. "The Infinite" has been defined as that which transcends Sense and Reason,—that which cannot be comprehended or completely and wholly understood, although it may be apprehended or partially conceived.* And no doubt, if this definition be applied, as by implication it always is applied, to the Power and to the resources, or to any other feature in the character of an Infinite Being, then it becomes a fair definition of the highest conceivable object of religious thought. But, again, if it be not so applied,—if it be understood as only applying to the impossibility under which we find ourselves of grasping anything which is limitless,—of counting an infinite number of units,—of traversing,

* Max Müller, Hibbert Lectures, 1878.

even in thought, an infinite space,—of living out an infinite time,—then "the Infinite" does not contain, even in the least degree, the one essential element which constitutes Religion.

Similar objections apply to another abstract phrase, sometimes used as a definition of the object of religious feeling, namely, "the Invisible." Mere material things, which are either too large to be wholly seen, or too small to be seen at all, can never supply the one indispensable element of Religion. In so far, therefore, as Invisibility applies to them only, it suggests nothing of a religious nature. But in so far as "the Invisible" means, and is intended to apply to, living Beings who are out of sight, to Personal Agencies which either have no bodily form, or who are thought of and conceived as separate from such form—in so far, of course, the "Invisible," like the Infinite, does cover and include the conception without which there can be no Religion.

Definitions of meaning are more or less important in all discussions; but there are many questions in which they are by no means essential, because of the facility with which we refer the abstract words we may be using to the concrete things,—to the actual phenomena to which they are applied. When, for example, we speak of the religion of Mahomet, or of the religion of Confucius, or of the religion of Buddha, we do not need to define what we mean by

the word "Religion," because in all of these cases the system of doctrine and the conceptions which constitute those religions are known, or are matters of historical evidence. But when we come to discuss the origin, not of any particular system of Belief, but of Religion in the abstract, some clear and intelligible definition of the word Religion becomes absolutely essential, because in that discussion we are dealing with a question which is purely speculative. It is idle to enter upon that speculative discussion unless we have some definite understanding what we are speculating about. In the case of Religion we cannot keep our understanding of the word fresh and distinct by thinking of any well-known and admitted facts respecting the beginnings of Belief. There are no such facts to go upon as regards the religion of Primeval Man. Those, indeed, who accept the narrative attributed to the inspired authority of the Jewish Lawgiver have no need to speculate. In that narrative the origin of Religion is identified with the origin of Man, and the Creator is represented as having had, in some form or another, direct communication with the Creature He had made. But those who do not accept that narrative, or who, without rejecting it altogether, regard it as so full of metaphor that it gives us no satisfying explanation, and who assume that Religion has had an origin subsequent to the

origin of the Species, have absolutely nothing to rely upon in the nature of History. There is no contemporary evidence, nor is there any tradition which can be trusted. Primeval Man has kept no journal of his own first religious emotions, any more than of his own first appearance in the world. We are therefore thrown back upon pure speculation—speculation, indeed, which may find in the present, and in a comparatively recent past, some data for arriving at conclusions, more or less probable, on the conditions of a time which is out of sight. But among the very first of these data, if it be not indeed the one datum without which all others are useless, is a clear conception of the element which is common to all Religions as they exist now, or as they can be traced back beyond the dawn of History into the dim twilight of Tradition. Of this universal element in all religions "the Infinite" is no definition at all. It is itself much more vague and indefinite in meaning than the word which it professes to explain. And this is all the more needless, seeing that the common element in all Religions, such as we know them now, is one of the greatest simplicity. It is the element of a Belief in superhuman Beings—in living Agencies, other and higher than our own.

It is astonishing how much the path of investigation is cleared before us the moment we have

arrived at this definition of the Belief which is fundamental to all Religions. That Belief is simply a Belief in the existence of Beings of whom our own Being is the type, although it need not be the Measure or the Form. By the very terms of the definition the origin of this Belief is and must be in ourselves—in our own conscious relationship to external facts. That is to say, the disposition to believe in the existence of such Beings arises out of the felt Unity of our own nature with the whole System of things in which we live and of which we are a part. It is the simplest and most natural of all conceptions, that the Agency of which we are most conscious in ourselves is like the Agency which works in the world around us. Even supposing this conception to be groundless, and that, as some now maintain, a more scientific investigation of natural agencies abolishes the conception of Design or Purpose, or of personal Will being at all concerned therein,—even supposing this, it is not the less true that the transfer of conceptions founded on our own consciousness of Agency and of Power within us to the Agencies and Powers around us, is a natural, if it be not indeed a necessary, conception. That it is a natural conception is proved by the fact that it has been, and still is, so widely prevalent; as well as by the fact that what is called the purely scientific conception of Natural Agencies is a modern conception, and one which is confessedly

of difficult attainment. So difficult indeed is it to expel from the mind the conception of Personality in or behind the Agencies of Nature, that it may fairly be questioned whether it has ever been effectually done. Verbal devices for keeping the idea out of sight are indeed very common; but even these are not very successful. I have elsewhere pointed out* that those naturalists and philosophers who are most opposed to all theological explanations or conceptions of natural Forces do, nevertheless, habitually, in spite of themselves, have recourse to language which derives its whole form, as well as its whole intelligibility, from those elements of meaning which refer to the familiar operations of our own Mind and Will. The very phrase "Natural Selection" is one which likens the operations of Nature to the operations of a Mind exercising the power of Choice. The whole meaning of the phrase is to indicate how Nature attains certain ends which are like "Selection." And what "Selection" is we know, because it is an operation familiar to ourselves. But the personal element of Will and of Purpose lies even deeper than this in the scientific theory of Evolution. When we ourselves select, we may very often choose only among things ready made to our hands. But in the theory of Evolution, Nature is not merely represented as choosing

* "Reign of Law," chaps. i. and v.

among things ready made, but as at first making the things which are to be afterwards fitted for selection. Organs are represented as growing in certain forms and shapes "in order that" they may serve certain uses, and then as being "selected" by that use in order that they may be established and prevail. The same idea runs throughout all the detailed descriptions of growth and of development by which these processes are directed to useful and serviceable results. So long as in the mere description of phenomena men find themselves compelled to have recourse to language of this sort, they have not emancipated themselves from the natural tendency of all human thought to see the elements of our own Personality in the energies and in the works of Nature.

But whether the attempt at such emancipation be successful or not, the very effort which it requires is a proof of the natural servitude under which we lie. And if it be indeed a natural servitude, the difficulty of getting rid of it is explained. It is hard to kick against the pricks. There is no successful rebellion against the Servitudes of Nature. The suggestions which come to us from the external world, and which are of such necessity that we cannot choose but hear them, have their origin in the whole constitution and course of things. To seek for any origin of them apart from the origin of our whole intellectual nature,

and apart from the relations between that nature and the facts of the Universe around us, is to seek for something which does not exist. We may choose to assume that there are no Intelligences in Nature superior to our own; but the fact remains that it is a part of our mental constitution to imagine otherwise. If, on the other hand, we assume that such Intelligences do exist, then the recognition of that existence, or the impression of it, is involved in no other difficulty than is involved in the origin of any other part of the furniture of our minds. What is the origin of Reason? The perception of Logical Necessity is the perception of a real relation between things; and this relation between things is represented by a corresponding relation between our conceptions of them. We can give no account of the origin of that perception unless we can give an account of the origin of Man, and of the whole system to which he stands related. What, again, is the origin of Imagination? It is the mental power by which we handle the elementary conceptions derived from our mental constitution in contact and in harmony with external things, and by which we recombine these conceptions in an endless variety of forms. We can give no account of the origin of such a power or of such a habit. What is the origin of Wonder? In the lower animals a lower form of it exists in the shape

of Curiosity, being little more than an impulse to seek for that which may be food, or to avoid that which may be danger. But in Man it is one of the most powerful and the most fruitful of all his mental characteristics. Of its origin we can give no other account than that there exists in Man an indefinite power of knowing, in contact with an equally indefinite number of things which are to him unknown. Between these two facts the connecting link is the wish to know. And, indeed, if the System of Nature were not a Reasonable System, the power of knowing might exist in Man without any wish to use it. But the System of Nature, being what it is—a System which is the very embodiment of Wisdom and Knowledge—such a departure from its Unity is impossible. That Unity consists in the universal and rational correspondence of all its essential facts. There would be no such correspondence between the powers of the human Mind and the ideas which they are fitted to entertain, if these powers were not incited by an appetite of inquiry. Accordingly, the desire of knowledge is as much born with Man as the desire of food. The impression that there are things around him which he does not know or understand, but which he can know and understand by effort and inquiry, is so much part of Man's Nature that Man would not be Man without it.

Religion is but a part of this impression—or rather it is the sum and consummation of all the intimations from which this impression is derived. Among the things of which he has an impression as existing, and respecting which he desires to know more, are, above all other things, Personalities or Agencies, or Beings having powers like, but superior to, his own. This is Religion. In this impression is to be found the origin of all Theologies. But of its own origin we can give no account until we know the origin of Man.

I have dwelt upon this point of definition because those who discuss the origin of Religion seem very often to be wholly unconscious of various assumptions which are necessarily involved in the very question they propound. One of these assumptions clearly is that there was a time when Man existed without any feeling or impression that any Being or Beings superior to himself existed in Nature or behind it. The assumption is that the idea of the existence of such Beings is a matter of high and difficult attainment, to be reached only after some long process of evolution and development. Whereas the truth may very well be, and probably is, that there never was a time since Man became possessed of the mental constitution which separates him from the Brutes, when he was destitute of some conception of the existence of living Agencies other

than his own. Instead of being a difficult conception, it may very well turn out to be, on investigation, the very simplest of all conceptions. The real difficulty may lie not in entertaining it, but in getting rid of it, or in restraining its undue immanence and power. The reason of this difficulty is obvious. Of all the Intuitive Faculties which are peculiar to Man, that of Self-consciousness is the most prominent. In virtue of that faculty or power, without any deliberate reasoning or logical process of any formal kind, Man must have been always familiar with the idea of energies which are themselves invisible, and only to be seen in their effects. His own loves and hates, his own gratitude and revenge, his own schemes and resolves, must have been familiar to him from the first as things in themselves invisible, and yet having power to determine the most opposite and the most decisive changes for good or evil in things which are visible and material. It never could have been difficult for him, therefore, to separate the idea of Personality, or of the efficiency of Mind and Will, from the attribute of visibility. It never could have been any difficulty with him to think of living Agencies other than his own, and yet without any Form, or with Forms concealed from sight. There is no need therefore to hunt farther afield for the origin of this conception than Man's own consciousness of himself. There is no need of going to the

winds which are invisible, or to the heavenly bodies which are intangible, or to the sky which is immeasurable. None of these, in virtue either of mere invisibility, or of mere intangibility, or of mere immeasurableness, could have suggested the idea which is fundamental in Religion. That idea was indeed supplied to Man from Nature; but it was from his own nature in communion with the nature of all things around him. To conceive of the energies that are outside of him as like the energies that he feels within him, is simply to think of the unknown in terms of the familiar and the known. To think thus can never have been to him any matter of difficult attainment. It must have been, in the very nature of things, the earliest, the simplest, and the most necessary of all conceptions.

The conclusion, then, to which we come from this analysis of Religion is that there is no reason to believe, but on the contrary many reasons to disbelieve, that there ever was a time when Man, with his existing constitution, lived in contact with the Forces and in face of the Energies of Nature, and yet with no impression or belief that in those energies, or behind them, there were Living Agencies other than his own. And if Man, ever since he became Man, had always some such impression or Belief, then he always had a Religion,

and the question of its origin cannot be separated from the origin of the Species.

It is a part of the Unity of Nature that the clear perception of any one truth leads almost always to the perception of some other, which follows from or is connected with the first. And so it is in this case. The same analysis which establishes a necessary connection between the self-consciousness of Man and the one fundamental element of all religious emotion and Belief, establishes an equally natural connection between another part of the same self-consciousness and certain tendencies in the development of Religion which we know to have been widely prevalent. For although in the operations of our own Mind and Spirit, with their strong and often violent emotions, we are familiar with a powerful Agency which is in itself invisible, yet it is equally true that we are familiar with that Agency as always working in and through a Body. It is natural, therefore, when we think of Living Agencies in Nature other than our own, to think of them as having some Form, or at least as having some Abode. Seeing, however, and knowing the work of those Agencies to be work exhibiting power and resources so much greater than our own, there is obviously unlimited scope for the imagination in conceiving what that Form and where that Abode may be. Given, therefore, these two inevitable

tendencies of the human Mind—the tendency to believe in the existence of Personalities other than our own, and the tendency to think of them as living in some Shape and in some Place—we have a natural and sufficient explanation, not only of the existence of Religion, but of the thousand forms in which it has found expression in the world. For as Man since he became Man, in respect to the existing powers and apparatus of his Mind, has never been without the consciousness of Self, nor without some desire of interpreting the things around him in terms of his own thoughts, so neither has he been without the power of imagination. By virtue of it he recombines into countless new forms not only the Images of Sense but his own instinctive interpretations of them. Obviously we have in this faculty the prolific source of an infinite variety of conceptions, which may be pure and simple or foul and unnatural, according to the elements supplied out of the moral and intellectual character of the minds which are imagining. Obviously, too, we have in this process an unlimited field for the development of good or of evil germs. The work which in the last chapter I have shown to be the inevitable work of Reason when it starts from any datum which is false, must be, in religious conceptions above all others, a work of rapid and continuous evolution. The steps of Natural Consequence,

when they are downward here, must be downwards along the steepest gradients. It must be so because the conceptions which men have formed respecting the Supreme Agencies in Nature are of necessity conceptions which give energy to all the springs of Action. They touch the deepest roots of Motive. In Thought they open the most copious fountains of Suggestion. In Conduct they affect the supreme influence of Authority, and the next most powerful of all influences, the influence of Example. Whatever may have been false or wrong, therefore, from the first in any religious conception must inevitably tend to become worse and worse with time, and with the temptation under which men have lain to follow up the steps of evil consequence to their ~~most~~ extreme conclusions.

Armed with the certainties which thus arise out of the very nature of the conceptions we are dealing with when we inquire into the origin of Religion, we can now approach that question by consulting the only other sources of authentic information, which are, first, the facts which Religion presents among the existing generations of men; and, secondly, such facts as can be safely gathered from the records of the past.

On one main point which has been questioned respecting existing facts, the progress of inquiry seems to have established beyond any reasonable

doubt that no race of men now exists so savage and degraded as to be, or to have been when discovered, wholly destitute of any conceptions of a religious nature. It is now well understood that all the cases in which the existence of such Savages has been reported, are cases which break down upon more intimate knowledge and more scientific inquiry.

Such is the conclusion arrived at by a careful modern inquirer, Professor Tiele, who says: "The statement that there are nations or tribes which possess no religion, rests either on inaccurate observations or on a confusion of ideas. No tribe or nation has yet been met with destitute of belief in any higher Beings, and travellers who asserted their existence have been afterwards refuted by facts. It is legitimate, therefore, to call Religion, in its most general sense, an universal phenomenon of humanity."*

Although this conclusion on a matter of fact is satisfactory, it must be remembered that, even if it had been true that some Savages do exist with no conception whatever of Living Beings higher than themselves, it would be no proof whatever that such was the primeval condition of Man. The arguments adduced in a former chapter, that the most degraded savagery of the present day is or may be the result

*"History of Religion," p. 6.

of Evolution working upon highly unfavourable conditions, are arguments which deprive such facts, even if they existed, of all value in support of the assumption that the lowest savagery was the condition of the first progenitors of our race. Degradation being a process which has certainly operated, and is now operating, upon some races, and to some extent, it must always remain a question how far this process may go in paralysing the activity of our higher powers, or in setting them, as it were, to sleep. It is well, however, that we have no such problem to discuss. Whether any Savages exist with absolutely no religious conceptions is, after all, a question of subordinate importance; because it is certain that, if they exist at all, they are a very extreme case and a very rare exception. It is notorious that, in the case of most Savages and of all Barbarians, not only have they some Religion, but their Religion is one of the very worst elements in their savagery or their barbarism.

Looking now to the facts presented by the existing Religions of the world, there is one of these facts which at once arrests attention, and that is the tendency of all Religions, whether savage or civilised, to connect the Personal Agencies who are feared or worshipped with some material object. The nature of that connection may not be always —it may not be even in any case,—perfectly clear

and definite. The rigorous analysis of our own thoughts upon such subjects is difficult, even to the most enlightened men. To rude and savage men it is impossible. There is no mystery, therefore, in the fact that the connection which exists between various material objects and the Beings who are worshipped in them or through them, is a connection which remains generally vague in the mind of the worshipper himself. Sometimes the material object is an Embodiment; sometimes it is a Symbol; often it may be only an Abode. Nor is it wonderful that there should be a like variety in the particular objects which have come to be so regarded. Sometimes they are such material objects as the heavenly bodies. Sometimes they are natural productions of our own Planet, such as particular trees, or particular animals, or particular things in themselves inanimate, such as springs, or streams, or mountains. Sometimes they are manufactured articles, stones or blocks of wood cut into some shape which has a meaning either obvious or traditional.

The universality of this tendency to connect some material objects with religious worship, and the immense variety of modes in which this tendency has been manifested, is a fact which receives a full and adequate explanation in our natural disposition to conceive of all Personal Agencies as living in

some Form and in some Place or as having some other special connection with particular things in Nature. Nor is it difficult to understand how the Embodiments, or the Symbols, or the Abodes, which may be imagined and devised by men, will vary according as their mental condition has been developed in a good or in a wrong direction. And as these imaginings and devices are never, as we see them now among Savages, the work of any one generation of men, but are the accumulated inheritance of many generations, all existing systems of worship among them must be regarded as presumably very wide departures from the conceptions which were primeval. And this presumption gains additional force when we observe the distinction which exists between the fundamental conceptions of Religious Belief and the forms of worship which have come to be the expression and embodiment of these. In the Religion of the highest and best races, in Christianity itself, we know the wide difference which obtains between the Theology of the Church and the popular superstitions which have been developed under it. These superstitions may be, and often are, of the grossest kind. They may be indeed, and in many cases are known to be, vestiges of Pagan worship which have survived all religious revolutions and reforms; but in other cases they are the natural and legitimate

development of some erroneous Belief accepted as part of the Christian Creed. Here, as elsewhere, Reason working on false data has been, as under such conditions it must always be, the great agent in degradation and decay.

CHAPTER XII.

On The Causes of Religious Corruption.

THE considerations set forth in the previous chapter indicate the fallacies which lie in our way when we endeavour to collect from the worship of savage nations any secure conclusions as to the origin of Religion. Upon these fallacies, and upon no more safe foundation, Comte built up his famous generalisation of the four necessary stages in the history of Religion. First came Fetishism, then Polytheism, and then Monotheism, and last and latest, the heir of all the ages, came Comtism itself, or the Religion of Humanity, which is to be the worship of the future.

Professor Max Müller has done memorable service in the analysis and in the exposure which he has given us of the origin and use of the word "Fetishism," and of the theory which represents it as a necessary stage in the development of Religion.* It turns out that the word itself, and the fundamental idea it embodies, is a

* "Hibbert Lectures," 1878.

word and an idea derived from one of those popular superstitions which are so common in connection with Latin Christianity. The Portuguese sailors who first explored the West Coast of Africa were themselves accustomed to attach superstitious value to beads, or crosses, or images, or charms, and amulets of their own. These were called "feitiços." They saw the negroes attaching some similar value to various objects of a similar kind, and these Portuguese sailors therefore described the negro worship as the worship of "feitiços." President de Brosses, a French philosopher of the Voltairean epoch in literature, then extended the term Fetish so as to include not only artificial articles, but also such great natural features as trees, mountains, rivers, and animals. In this way he was enabled to classify together, under one indiscriminate appellation, many different kinds of worship and many different stages in the history of religious development or decay. This is an excellent example of the crude theories and false generalisations which have been prevalent on the subject of the origin of Religion. First, there is the assumption that whatever is lowest in savagery must have been primeval—an assumption which, as we have seen, is in all cases improbable, and in many cases must necessarily be false. Next there is great carelessness in ascertaining what is really true even of

existing Savages in respect to their religious Beliefs. It has now been clearly ascertained that those very African negroes whose superstitious worship of material articles, supposed to have some mysterious powers or virtues, is most degraded, do nevertheless retain, behind and above this worship, certain Beliefs as to the nature of the Godhead, which are almost as far above their own abject superstitions as the theology of a Fénélon is above the superstitions of an ignorant Roman Catholic peasant. It is found that some African tribes have retained their belief in one Supreme Being, the Creator of the world, and the circumstance that nevertheless no worship may be addressed to Him has received from Professor Max Müller an explanation which is ample. "It may arise from an excess of reverence quite as much as from negligence. Thus the Odjis or Cohantis call the Supreme Being by the same name as the sky; but they mean by it a Personal God, who, as they say, created all things and is the Giver of all good things. But though He is omnipresent and omniscient, knowing even the thoughts of men, and pitying them in their distress, the government of the world is, as they believe, deputed by Him to inferior Spirits, and among these, again, it is the malevolent Spirits only who require worship and sacrifice from Man." * And this is by no means a solitary case.

* "Hibbert Lectures," pp. 107, 108.

There are many others in which the investigations of missionaries respecting the religious conceptions of savage nations have revealed the fact that they have a much higher theology than is indicated in their worship.

The truth is, that nowhere is the evidence of development in a wrong direction so strong as in the many customs of savage and barbarous nations which are more or less directly connected with Religion. The idea has long been abandoned that the Savage lives in a condition of freedom as compared with the complicated obligations imposed by Civilisation. Savages, on the contrary, are under the tyranny of innumerable Customs which render their whole life a slavery from the cradle to the grave. And what is most remarkable is the irrational character of most of these Customs, and the difficulty of even imagining how they can have become established. They bear all the marks of an origin far distant in time—of a connection with doctrines which have been forgotton, and of conceptions which have run, as it were, to seed. They bear, in short, all the marks of long attrition, like the remnants of a bed of rock which has been broken up at a distant epoch of geological time, and has left no other record of itself than a few worn and incoherent fragments in some far-off conglomerate. Just as these fragments are now held

together by common materials which are universally distributed, such as sand or lime, so the worn and broken fragments of old Religions are held together, in the shape of barbarous customs, by those common instincts and aspirations of the human Mind which follow it in all its stages, whether of growth or of decay. The rapidity of the processes of degradation in Religion, and the extent to which they may go, depends on a great variety of conditions. It has gone very far indeed, and has led to the evolution of Customs and Beliefs of the most destructive kind among races which, so far as we know, have never been exposed to external conditions necessarily degrading. The innate character of this tendency to corruption, arising out of causes inherent in the nature of Man, becomes indeed all the more striking when we find that some of the most terrible practices connected with religious superstition, are practices which have become established among tribes which are by no means in the lowest physical condition, and who inhabit countries highly blest by Nature. Perhaps there is no example of this phenomenon more remarkable than the "customs" of Dahomey, a country naturally rich in products, and affording every facility for the pursuits of a settled and civilised life. Yet here we have those terrible Beliefs which demand the constant, the almost daily sacrifice of human life,

with no other aim or purpose than to satisfy some imaginary Being with the sight of clotted gore and with the smell of putrefying human flesh. This is only an extreme and a peculiarly terrible example of a general law, the operation of which is more or less clearly seen in every one of the Religions of the heathen world, whether of the past or of the present time. In the very earliest ages in which we become acquainted with the customs of their worship, we find these in many respects strange and unaccountable, except on the supposition that even then they had come from far, and had been subject to endless deviations and corruptions through ages of a long descent.

Of no Religion is this more true than of that which was associated with the oldest Civilisation known to us—the Civilisation of Egypt. So strange is the combination here of simple and grand conceptions with grotesque symbols and with degrading objects of immediate worship, that it has been the inexhaustible theme of curious explanations. Why a Snake or why a Dung-beetle should have been taken to represent the Divine Being, and why in the holiest recess of some glorious Temple we find enshrined as the object of adoration the image or the coffin of some beast, or bird, or reptile, is a question on which much learned ingenuity has been spent. It has been suggested, for example, that a

conquering race, bringing with it a higher and a purer faith, suffered itself to adopt or to embody in its system the lower symbolism of a local worship. But this explanation only removes the difficulty—if it be one—a step farther back. Why did such sufferance arise? why was such an adoption possible? It was possible simply because there is an universal tendency in the human Mind to developments in the wrong direction, and especially in its spiritual conceptions to become more and more gross and carnal.

Nor is it difficult to follow some, at least, of the steps of consequence, that is to say, the associations of thought, by which worship may become degraded when once any serious error has been admitted. Animal worship, for example, may possibly have begun with very high and very profound conceptions. We are accustomed to regard it as a very grotesque and degraded worship, and so no doubt it was in its results. But if we once allow ourselves to identify the Divine Power in Nature with any one of its operations, if we seek for the visible presence of the Creator in any one of His creations, I do not know that we could choose any in which that Presence seems so imminent as in the wonderful Instincts of the lower animals. In a previous chapter we have seen what knowledge and what foreknowledge there is involved in some of these.

We have seen how it often seems like direct Inspiration that creatures without the gift of Reason should be able to do more than the highest human Reason could enable us to do—how wonderful it is, for example, that their prevision and provision for the nurture and development of their young should cover the whole cycle of operations in that second work of creation which is involved in the Metamorphoses of Insects—all this, when we come to think of it, may well seem like the direct working of the Godhead. We have seen in a former chapter that men of the highest genius in philosophical speculation, like Descartes, and men of the highest skill in the popular exposition of scientific ideas, like Professor Huxley, have been led by these marvels of Instinct to represent the lower animals as automata or machines. The whole force and meaning of this analogy lies in the conception that the work done by animals is like the work done by the mechanical contrivances of men. We look always upon such work as done not by the machine but by the contriving Mind which is outside the machine, and from whom its adjustments are derived. Fundamentally, however little it may be confessed or acknowledged, this is the same conception which, in a less scientific age, would take another form. What is seen in the action of an automaton is not the mechanism but the result. That result is the work of Mind,

which seems as if it were indwelling in the machine. In like manner, what is seen in animals is the wonderful things they do ; and what is not seen, and is indeed wholly incomprehensible, is the machinery by which they are made to do it. Moreover, it is a machinery having this essential distinction from all human machines, that it is endowed with Life, which in itself also is the greatest mystery of all.

It is, therefore, no superficial observation of animals, but, on the contrary, a deep pondering on the wonders of their economy, which may have first suggested them to religious men as at once the Type and the Abode of that Agency which is supreme in Nature. I do not affirm as an historical fact that this was really the origin of Animal-worship, because that origin is not historically known, and, like the origin of Religion itself, it must be more or less a matter of speculation. Some animals may have become objects of worship from having originally been the subjects of sacrifice. The victim may have been so associated with the God to whom it was devoted as to become His accepted Symbol. The Ox and the Bull may well have been consecrated through this process of substitution. But no such explanation can be given in respect to many animals which have been worshipped as divine. Perhaps no further explanation need be sought than that which would be equally required to account for the

choice of particular plants, or particular birds and fishes, as the badges of particular tribes and families of men. Such badges were almost universal in early times, and many of them are still perpetuated in armorial bearings. The selection of particular animals in connection with worship would be determined in different localities by a great variety of conditions. Circumstances purely accidental might determine it. The occurrence, for example, in some particular region of any animal with habits which are at once curious and conspicuous, would sufficiently account for the choice of it as the Symbol of whatever idea these habits might most readily suggest or symbolise. It is remarkable, accordingly, that in some cases, at least, we can see the probable causes which have led to the choice of certain creatures. The Egyptian Beetle, the Scarabæus, for example, represents one of those forms of Insect life in which the marvels of Instinct are at once very conspicuous and very curious. The characteristic habit of the Scarabæus Beetle is one which involves all that mystery of prevision for the development of the species which is common among insects, coupled with a patient and laborious perseverance in the work required, which does not seem directly associated with any mere appetite or with any immediate source of pleasure. The instinct by which this beetle chooses the material which is the proper nidus for its egg, the skill with

which it works that material into a form suitable for the purpose, and the industry with which it then rolls it along the ground till a suitable position is attained—all these are a striking combination of the wonders of Animal Instinct, and conspicuous indication of the Spirit of Wisdom and of Knowledge which may well be conceived to be present in their work.

But although it is in this way easy to imagine how some forms of Animal-worship may have had their origin in the first perception of what is really wonderful, and in the first admiration of what is really admirable, it is also very easy to see how, when once established, it would tend to rapid degradation. Wonder and reverence are not the only emotions which impel to worship. Fear and even horror, especially when accompanied with any mystery in the objects of alarm, are emotions suggesting, perhaps more than any, that low kind of worship which consists essentially in the idea of Deprecation. Some hideous and destructive animals, such as the Crocodile, may have become sacred objects neither on account of anything admirable in their instincts nor on account of their destructiveness, but, on the contrary, because of being identified with an agency which is beneficent. To those who live in Egypt, the Nile is the perennial source of every blessing necessary to life. An

animal so characteristic of that great River may well have been chosen simply as the Symbol of all that it was and of all that it gave to men. There is no mystery, therefore, in the Crocodile being held sacred in the worship of the God of Inundation. But there are other animals which have been widely invested with a sacred character, in respect to which no such explanation can be given. The worship of Serpents has been attributed to conceptions of a very abstract character—with the circle, for example, into which they coil themselves considered as an emblem of Eternity. But this is a conception far too transcendental and far-fetched to account either for the origin of this worship, or for its wide extension in the world. Serpents are not the only natural objects which present circular forms. Nor is this attitude of their repose, curious and remarkable though it be, the most striking peculiarity they present. They have been chosen, beyond any reasonable doubt, because of the horror and terror they inspire. For this, above all other creatures, they are prominent in Nature. For their deceptive colouring,—for their insidious approach,—for their deadly virus,—they have been taken as the type of spiritual poison in the Jewish narrative of the Fall. The power of inflicting almost immediate death, which is possessed by the most venomous Snakes, and that not by violence, but

by the infliction of a wound which in itself may be hardly visible, is a power which is indeed full of mystery even to the most cultivated scientific mind, and may well have inspired among men in early ages a desire to pacify the Powers of Evil. The moment this becomes the great aim and end of worship, a principle is established which is fertile in the development of every foul imagination. Whenever it is the absorbing motive and desire of men to do that which may most gratify or pacify Malevolence, then it ceases to be at all wonderful that men should be driven by their religion to sacrifices the most horrid, and to practices the most unnatural.

But if we wish to see an illustration and an example of the power of all conceptions of a religious nature in the rapid evolution of unexpected consequences, we have such an example in the case of one man who has lived in our own time, and who still lives in the school which he has founded. I refer to Auguste Comte. It is well known that he denied the existence, or at least denied that we can have any knowledge of the existence, of such a Being as other men mean by God. Mr. John Stuart Mill has insisted with much earnestness and with much force that, in spite of this denial, Auguste Comte had a Religion. He says it was a Religion without a God. But the truth is, that it was a Religion having both a

creed and an ideal object of worship. That ideal object of worship was an abstract conception of the Mind so definitely invested with Personality that Comte himself gave to it the title of The Great Being (*Grand Etre*). The abstract conception thus personified was the abstract conception of Humanity—Man considered in his past, his present, and his future. Clearly this is an intellectual Fetish. It is not the worship of a Being known or believed to have any real existence. It is the worship of an Idea shaped and moulded by the Mind, and then artificially clothed with the attributes of Personality. It is the worship of an article manufactured by the imagination, just as Fetishism, in its strictest meaning, is the worship of an article manufactured by the hand. Nor is it difficult to assign to it a place in that classification of Religions in which a loose signification has been assigned to the term Fetishism. The worship of Humanity is merely one form of Animal-worship. Indeed, Comte himself specially included the whole Animal Creation. It is the worship of the Creature Man as the consummation of all other Creatures, with all the marvels and all the unexhausted possibilities of his moral and intellectual nature.

The worship of this Creature may certainly be in the nature of a Religion, as much higher than other forms of Animal-worship as Man is higher than a Beetle or an Ibis, or a Crocodile, or a Serpent. But so also, on the

other hand, it may be a Religion as much lower than the worship of other animals, in proportion as Man can be wicked and vicious in a sense in which the Beasts cannot. Obviously therefore such a worship would be liable to special causes of degradation. We have seen it to be one of the great peculiarities of Man, as distinguished from the lower animals, that whilst they always obey and fulfil the highest law of their Being, there is no similar perfect obedience in the case of Man. On the contrary, he often uses his special powers with such perverted ingenuity that they reduce him to a condition more miserable and more degraded than the condition of any Beast. It follows that the worship of Humanity must, as a Religion, be liable to corresponding degradation. The Philosopher, or the Teacher, or the Prophet who may first personify this abstract conception, and enshrine it as an object of worship, may have before him nothing but the highest aspects of human nature and its highest aspirations. Mill has seen and has well expressed the limitations under which alone such a worship could have any good effect. "That the ennobling power of this grand conception may have its full efficacy, he should, with Comte, regard the *Grand Etre*, Humanity or Mankind, as composed in the past solely of those who, in every age and variety of position, have played their part worthily in life. It is only as thus restricted that the aggregate

of our species becomes an object worthy of our veneration." * This, no doubt, was Comte's own idea. But how are his disciples and followers to be kept up to the same high standard of conception? Comte seems to have been personally a very high-minded and a very pure-minded man. His morality was austere, almost ascetic, and his spirit of devotion found delight in the spirit of the Christian Mystics. Yet even in his hands the development of his conceptions led him to results eminently irrational, although it cannot be said that they were ever degrading or impure. But we have only to consider how comparatively rare are the examples of the highest human excellence, and how common and prevailing are the vices and weaknesses of Humanity, to see how terrible would be the possibilities and the probabilities of corruption in a Religion which had Man for the highest object of its worship.

Nor is this all that is to be said on the inevitable tendency to degradation which must attend any worship of Humanity. Not only are the highest forms of human virtue rare, but even when they do occur, they are very apt to be rejected and despised of men. Power and strength, however vicious in its exercise, almost always receives the homage of the world. The human Idols, therefore, who would be chosen as Symbols in the worship of Humanity would often be

* Mill's "Comte and Positivism," p. 136.

those who set the very worst examples to their Kind. Perhaps no better illustration of this could be found than the history of Napoleon Buonaparte. I think it is impossible to follow that history, as it is now known, without coming to the conclusion that in every sense of the word he was a bad man — unscrupulous, false, and mean. But his intellect was powerful, whilst his force and energy of character were tremendous. These qualities alone, exhibited in almost unexampled military success, were sufficient to make him the Idol of many minds. And as mere success secured for him this place, so nothing but failure deprived him of it. Not a few of the chosen heroes of Humanity have been chosen for reasons but little better. Comte himself, seeing this danger, and with an exalted estimate and ideal of the character of Womanhood, had laid it down that it would be best to select some woman as the symbol, if not the object, of private adoration in the worship of Humanity. The French Revolutionists selected a woman, too, and we know the kind of woman that they chose. It may be wise, perhaps, to set aside this famous episode in a fit of national insanity as nothing more than a profane joke; but the developments of Anthropomorphism in the mythology of the Pagan world are a sufficient indication of the kind

of worship which the worship of Humanity would certainly tend to be.

The result, then, of this analysis of that in which all Religion essentially consists, and of the objects which it selects, or imagines, or creates for worship, is to show that in Religion above all other things the processes of Evolution are especially liable to work in the direction of Degradation. That analysis shows how it is that in the domain of religious conceptions, even more than in any other domain of thought, the work of Development must be rapid, because in the absence of Revelation or the teachings of Authority, fancy and imagination have no guide and are under no restraint.

When, now, we pass from the phenomena which Religion presents in the present day to what we know of its phenomena in the earliest historic times, the conclusions we have reached receive abundant confirmation. Of the origin of Religion, indeed, as we have already seen, History can tell us nothing, because, unless the Mosaic narrative be accepted, there is no history of the origin of Man. But the origin of particular systems of Religion does come within the domain of History, and the testimony it affords is always to the same effect. In regard to them we have the most positive evidence that they have been uniformly subject to Degradation. All the great Religions of the world which can be traced

to the teaching or influence of individual men have steadily declined from the teaching of their Founders. In India it has been one great business of Christian missionaries and of Christian governors, in their endeavours to put an end to cruel and barbarous customs, to prove to the corrupt disciples of an ancient Creed that its first Prophets or Teachers had never held the doctrines from which such customs arise, or that these customs are a gross misconception and abuse of the doctrine which had been really taught. Whether we study what is now held by the disciples of Buddha, of Confucius, or of Zoroaster, it is the same result. Wherever we can arrive at the original teaching of the known Founders of religious systems, we find that teaching uniformly higher, more spiritual, than the teaching now.

The same law has affected Christianity, with this difference only, that alone of all the Historical Religious of the world it has hitherto shown an unmistakable power of perennial revival and reform. But we know that the processes of corruption had begun their work even in the lifetime of the Apostles; and every Church in Christendom will equally admit the general fact, although each of them will give a different illustration of it. Mahommedanism, which is the last and latest of the great Historical Religions of the world, shows a still more remarkable phenomenon. The corruption in this case began not only

in the lifetime, but in the life of the Prophet and Founder of that Religion. Mahomet was himself his own most corrupt disciple. In the earliest days of his mission he was best as a Man and greatest as a Teacher. His life was purer and his doctrine more spiritual when his voice was a solitary voice crying in the wilderness, than when it was joined in chorus by the voice of many millions. In his case the progress of Development in a wrong direction was singularly distinct and very rapid. Nor is the cause obscure. The spirit of Mahomet may well have been in close communion with the Spirit of all truth, when, like St. Paul at Athens, his heart was first stirred within him as he saw his Arabian countrymen wholly given to idolatry. Such deep impressions on some everlasting truth—such overpowering convictions—are in the nature of Inspiration. The intimations it gives and the impulses it communicates are true in thought and righteous in motive, in exact proportion as the reflecting surfaces of the human Mind are accurately set to the lights which stream from Nature. This is the Adjustment which gives all their truthfulness to the intimations of the Senses; which gives all its wisdom and foresight to the wonderful work of Instinct; which gives all their validity to the processes of Reason; which is the real source of all the achievements of Genius, and which on the highest level of all, has made

some men the inspired Prophets of the Oracles of God.

But this is the tenderest of all Adjustments—the most delicate, the most easily disturbed. When this Adjustment is, as it were, mechanical, as it is in the lower animals, then we have the limited, but, within its own sphere, the perfect wisdom of the Beasts. But when this Adjustment is liable to distortion by the action of a Will which is to some extent self-determined and is also to a large extent degraded, when the real Inspiration is not from without, but from within—then the reflecting surfaces of Mind are no longer set true to the Light of Nature; and then, "If the light within us be darkness, how great is that darkness!" Hence it is that one single mistake or misconception as to the nature and work of Inspiration is, and must be, a mistake of tremendous consequence. And this was Mahomet's mistake. He thought that the source of his Inspiration was direct, immediate, and personal. He thought that even the very words in which his own impulses were embodied were dictated by the Angel Gabriel. He thought that the Supreme Authority which spoke through him when he proclaimed that "the Lord God Almighty was one God, the Merciful, the Compassionate," was the same which also spoke to him when he proclaimed that it was lawful for him to take his neighbour's wife. From such an abounding well-spring of

delusion the most bitter waters were sure to come. How different this idea of the methods in which the Divine Spirit operates upon the minds of men from the idea held on the same subject by that great Apostle of our Lord, whose work it was to spread among the Gentile world those religious conceptions which had so long been the special heritage of one peculiar people! How cautious St. Paul is when expressing an opinion not directly sanctioned by an authority higher than his own! "I think also that I have the Spirit of God." The injunction, "Try the spirits whether they be of God," is one which never seems to have occurred to Mahomet. The consequences were what might have been expected. The utterances of his Inspiration when he was hiding in the caves of Mecca were better, purer, higher than those which he continued to pour forth when, after his flight to Medina, he became a great Conqueror and a great Ruler. From the very first indeed he breathed the spirit of personal anger and malediction on all who disbelieved his message. This root of bitterness was present from the beginning. But its developments were indeed prodigious. It was the animating spirit of precepts without number which, in the minds and in the hands of his ruthless followers, have inflicted untold miseries for twelve hundred years on some of the fairest regions of the Globe.

Passing now from the evidence of the law of corruption and decline which is afforded by this last and latest of the great Historical Religions of the world, we find the same evidence in those of a much older date. In the first place, all the Founders of those Religions were themselves nothing but Reformers. In the second place, the reforms they instituted have themselves all more or less again yielded to new developments of decay. The great Prophets of the world have all been men of Inspiration or of Genius who were revolted by the corruptions of some pre-existing system, and who desired to restore some older and purer faith. The form which their reformation took was generally determined, as all strong revolts are sure to be, by violent reaction against some prominent conception or some system of practice which seemed, as it were, an embodiment of its corruption. In this way only can we account for the peculiar direction taken by the teaching of that one great historical Religion which is said to have more disciples than any other in the world. Buddhism was in its origin a reform of Brahminism. In that system the Beliefs of a much older and simpler age had become hid under the rubbish-heaps of a most corrupt development. Nowhere perhaps in the world had the work of Evolution been richer in the growth of briers and thorns. It had forged the iron bonds

of Caste, one of the very worst inventions of an evil imagination; and it had degraded worship into a complicated system of sacrifice and of ceremonial observances.

There seems to be no doubt that the teaching of the reformer Sakya Muni (Buddha) was a revolt and a reform. It was a reassertion of the paramount value of a Life of Righteousness. But the intellectual conceptions which are associated with this great ethical and spiritual reform had within themselves the germs of another cycle of decay. These conceptions seem to have taken their form from the very violence of the revulsion which they indicate and explain. The peculiar tenet of Buddhism, which is or has been interpreted to be a denial of any Divine Being or of personal or individual Immortality, seems the strangest of all doctrines on which to recommend a life of virtue, of self-denial, and of religious contemplation. But the explanation is apparently to be found in the extreme and ridiculous developments which the doctrines of Divine Personality and of individual Immortality had taken under the Brahminical system. These developments do indeed seem almost incredible, if we did not know from many other examples the incalculable wanderings of the human imagination in the domain of religious thought. The doctrine of the transmigration of Souls at death into the bodies of Beasts was a

doctrine pushed to such extravagances of conception, and yet believed in with such intense conviction, that pious Brahmins did not dare even to breathe the open air lest by accident they should destroy some invisible animalcule in which was embodied the Spirit of their ancestors. Such a notion of Immortality might well oppress and afflict the spirit with a sense of intolerable fatigue. Nor is it difficult to understand how that desire of complete Attainment, which is, after all, the real hope of Immortality, should have been driven to look for it rather in reabsorption into some one universal Essence, and so to reach at last some final Rest. Freedom from the burden of the flesh, rendered doubly burdensome by the repeated cycles of animal existence which lay before the Brahmin, was the end most naturally desired. For indeed, complete annihilation might well be the highest aspiration of souls who had before them such conceptions of personal Immortality and its gifts.

A similar explanation is probably the true one of the denial of any God. A prejudice had arisen against the very idea of a Divine Being from the concomitant ideas which had become associated with Personality. The original Buddhist denial of a God was probably, in his heart of hearts, merely a denial of the grotesque limitations which had been associated with the popular conception of Him. It was a devout

and religious aspect of that most unphilosophical negation which in our own days has been called the "Unconditioned." In short, it was only a metaphysical, and not an irreligious, Atheism. But although this was probably the real meaning of the Buddhistic Atheism in the mind of its original teachers, and although this meaning has reappeared and has found intelligent expression among many of its subsequent expounders, it was in itself one of those fruitful germs of error which are fatal in any system of Religion. The negation of any Divine Being or Agency, at least under any aspect or condition conceivable by Man, makes a vacuum which nothing else can fill. Or rather, it may be said to make a vacuum which every conceivable imagination rushes in to occupy. Accordingly Buddha himself seems to have taken the place of a Divine Being in the worship of his followers. His was a real Personality—his was the Ideal Life. All history proves that no abstract system of doctrine, no mere rule of life, no dreamy aspiration, however high, can serve as an object of worship for any length of time. But a great and a good Man can be always deified. And so it has been with Buddha. Still this deification was, as it were, an usurpation. The worship of himself was no part of the Religion he taught, and the vacuum which he had created in speculative Belief was one

which his own Image, even with all the swellings of tradition, was inadequate to fill. And so Buddhism appears to have run its course through every stage of mystic madness, of gross idolatry, and of true fetish-worship, until, in India at least, it seems likely to be re-absorbed in the Brahminism from which it originally sprang.

And so we are carried back to the origin of that great Religion, Brahminism, which already in the sixth or seventh century before the Christian era had become so degraded as to give rise to the revolt of Buddha. The course of its development can be traced in an elaborate literature which may extend over a period of about 2000 years. That development is beyond all question one of the greatest interest in the history of Religion, because it concerns a region and a race which have high traditional claims to be identified with one of the most ancient homes, and one of the most ancient families of Man. And surely it is a most striking result of modern inquiry that in this, one of the oldest literatures of the world, we find that the most ancient religious appellation is Heaven-Father, and that the words "Dyauspitar" in which this idea is expressed are the etymological origin of Jupiter—*Ζεύς πατήρ*—the name for the supreme Deity in the mythology of the Greeks.*

We must not allow any preconceived ideas to

* "Hibbert Lectures," by Max Müller.

obscure the plain evidence which arises out of this simple fact. We bow to the authority of Sanskrit scholars when they tell us of it. But we shall do well to watch the philosophical explanations with which they may accompany their intimations of its import. Those who approach the subject with the assumption that the Idea of a Divine Being or a Superhuman Personality must be a derivative, and cannot be a primary conception, allow all their language to be coloured by the theory that vague perceptions of "The Invisible" or "The Infinite," in rivers, or in mountains, or in sun and moon and stars, were the earliest religious conceptions of the human Mind. But this theory cannot be accepted by those who remember that there is nothing in Nature so near to us as our own nature,—nothing so mysterious and yet so intelligible,—nothing so invisible, yet so suggestive of energy and of power over things that can be seen. Nothing else in Nature speaks to us so constantly or so directly. Neither the Infinite nor the Invisible contains any religious element at all, unless as conditions of a Being of which invisibility and infinitude are attributes. There is no probability that any abstract conceptions whatever about the nature or properties of material Force can have been among the earliest conceptions of the human Mind. Still less is it reasonable to suppose that such concep-

tions were more natural and more easy conceptions than those founded on our own Personality and on the Personality of Parents.

Yet it seems as if it were in deference to this theory that Professor Max Müller is disposed to deprecate the supposition that the "Heaven-Father" of the earliest Vedic Hymns is rightly to be understood as having meant "what we mean by God." Very probably indeed it may have meant something much more simple. But not the less on that account it may have meant something quite as true. I do not know, indeed, why we should set any very high estimate on the success which has attended the most learned Theologians, in giving anything like form or substance to our conceptions of the Godhead. Christianity solves the difficulty by presenting, as the type of all true conceptions on the subject, the image of a Divine Humanity, and the history of a perfect Life. In like manner, those methods of representing the character and attributes of the Almighty, which were employed to teach the Jewish people, were methods all founded on the same principle of a sublime Anthropopsychism. In the New Testament there are not less sublime Similitudes, in which the Godhead is identified with the highest and holiest conceptions which we can derive from the material or the spiritual world. Such are the passages, "God is Love," and again "God is Light,

and in Him is no Darkness at all." But when we come to the abstract definitions of subsequent Theology, they invariably end either in self-contradictions, or in words in which beauty of rhythm takes the place of intelligible meaning. Probably no body of men ever came to draw up such definitions with greater advantages than the Reformers of the English Church. They had before them all the sublime imagery of the Prophets—all the profound similitudes of the Apostles—all the traditions of the Christian world—all the language of Philosophy—all the subtleties of the Schools. Yet, of the Godhead, they can only say as a negative definition, that God is "without body, parts, or passions." But, if by "passions" we are to understand all mental affections, this definition is not only in defiance of the whole language of the Jewish and of the Christian Scriptures, but in defiance also of all that is conceivable of the Being who is the Author of all good, and the fountain of all love, but who hates evil, and is angry with the wicked every day. A great master of the English tongue has given another definition in which, among other things, it is affirmed that the attributes of God are "incommunicable." * Yet, at least, all the good attributes of all creatures must be conceived as communicated to them by their Creator, in whom all fulness dwells.

* J. H. Newman, "Idea of a University," p. 60.

I do not know, therefore, by what title we are to assume that "what we mean by God" is certainly so much nearer the truth than the simplest conceptions of a Primeval Age. It is at least possible that in that Age there may have been intimations of the Divine Personality, and of the Divine Presence which we have not now. Moreover, there may have been developments of error in this high matter, which may well shake our confidence in the unquestionable superiority of "what we mean by God" over what may have been meant and understood by our earliest fathers in respect to the Being whom they adored. Some conceptions of the Divine Being which have been prevalent in the Christian Church, have been formed upon theological traditions so questionable that the developments of them have been among the heaviest burdens of the Faith. It is not too much to say that some of the doctrines derived from scholastic Theology and once most widely accepted in the Christian Church—such, for example, as the fate of unbaptized Infants—are doctrines which present the nature and character of the Godhead in aspects as irrational as they are repulsive. One of the most remarkable schools of Christian thought which has arisen in recent times is that which has made the idea of the "Fatherhood of God" the basis of its distinctive teaching. Yet it is nothing but a

reversion to the simplest of all ideas, the most rudimentary of all experiences—that which takes the functions and the authority of a Father as the most natural image of the Invisible and Infinite Being to whom we owe "life and breath and all things." In the facts of Vedic literature, as now sifted and presented to us by scholars, when we carefully separate these facts from theories about them, there is really no symptom of any time when the idea of some Living Being in the nature of God had not yet been attained. On the contrary the earliest indications of this conception are indications of the sublimest character, and the process of Evolution seems distinctly to have been a process not of an ascending but of a descending order. Thus it appears that the great appellative "Dyaus," which in the earliest Vedic literature is masculine and stood for "The Bright or Shining One," or the Living Being whose dwelling is the Light, had in later times become a feminine and stood for nothing but the sky.* It is quite evident that in the oldest times of the Aryan race, in so far as those times have left us any record, not only had the idea of a Personal God been fully conceived, but such a Being had been described, and addressed in language and under symbols which are comparable with the sublimest imagery in the Visions of Patmos. How firmly, too, and how naturally

* "Hibbert Lectures," pp. 276, 277.

these conceptions of a God were rooted in the analogies of our own human Personality is attested by the additional fact that Paternity was the earliest Vedic idea of Creation, and Dyaus was invoked not only as the Heaven-Father but specially as the "Dyaush pitâ ganitâ," which is the Sanskrit equivalent of the Greek *Ζεὺς πατὴρ γενετήρ.*

When, again, we are told by Sanskrit scholars that the earliest religious conceptions of the Aryan race, as exhibited in the Veda, were Pantheistic, and that the Gods they worshipped were "Deifications" of the Forces or Powers of Nature, we are to remember that this is an interpretation and not a fact. It is an interpretation, too, which assumes the familiarity of the human mind in the ages of its infancy with one of the most doubtful and difficult conceptions of modern science—namely, the abstract conception of Energy or Force as an inseparable attribute of Matter. The only fact, divested of all preconceptions, which these scholars have really ascertained is, that in compositions which are confessedly poetical the Energies of Nature were habitually addressed as the Energies of Personal or Living Beings. But this fact does not in the least involve the supposition that the Energies of Nature which are thus addressed had, at some still earlier epoch, been regarded under the aspect of Material Forces, and had afterwards come

to be Personified ; nor does it in the least involve the other supposition that, when so Personified, they were really regarded as so many different Beings absolutely separate and distinct from each other. Both of these suppositions may indeed be matter of argument ; but neither of them can be legitimately assumed. They are, on the contrary, both of them open to the most serious, if not to insuperable objections. As regards the first of them—that the earliest human conceptions of Nature were of that most abstruse and difficult kind which consists in the idea of Material Force without any living embodiment or abode, I have already indicated the grounds on which it seems in the highest degree improbable. As regards the second supposition, viz., that when Natural Forces came to be Personified each one of them was regarded as the embodiment of a separate and distinct Divinity—this is a most unsafe interpretation of the language of poetry. The purest Monotheism has a Pantheistic side. To see all things in God is very closely related to seeing God in all things. The giving of separate names to diverse manifestations of one Divine Power may pass into Polytheism by insensible degrees. But it would be a most erroneous conclusion from the use of such names at a very early stage in the history of religious development, that those who so employed them had no conception of One Supreme Being. In the Philosophy of

Brahminism even, in the midst of its most extravagant Polytheistic developments, not only has this idea been preserved, but it has been taught and held as the central idea of the whole system. "There is but one Being—no second." Nothing really exists but the one Universal Spirit, called Brahmin; and whatever appears to exist independently is identical with that Spirit.* This is the uncompromising creed of true Brahminism. If, then, this creed can be retained even amidst the extravagant Polytheism of later Hindu corruptions, much more easily could it be retained in the early Pantheism of the Vedic Hymns.

There is, however, one kind of evidence remaining, which may be said to be still within the domain of history, and that is the evidence derived from Language, from the structure and etymology of words. This evidence carries us a long way further back, even to the time when Language was in the course of its formation, and long before it had been reduced to writing. From this evidence, as we find it in the facts reported respecting the earliest forms of Aryan speech, it seems certain that the most ancient conceptions of the energies of Nature were conceptions of Personality. In that dim and far-off time, when our pre-historic ancestors were speaking in a language long anterior to the formation of the oldest Sanskrit, we are told that they called the Sun

* Professor Monier Williams, "Hinduism," p. 11.

the Illuminator, or the Warmer, or the Nourisher; the Moon, the Measurer; the Dawn, the Awakener; the Thunder, the Roarer; the Rain, the Rainer; the Fire, the Quick-Runner.* We are told further that in these Personifications the earliest Aryans did not imagine them as possessing the material or corporeal Forms of Humanity, but only that the activities they exhibited were most easily conceived as comparable with our own. Surely this is a fact which is worth volumes of speculation. What was most easy and most natural then, must have been most easy and most natural from the beginning. With such a propensity in the earliest men of whom we have any authentic record to see personal agency in everything, and with the general impression of unity and subordination under one system which is suggested by all the phenomena of Nature, it does not seem very difficult to suppose that the fundamental conception of all Religion may have been in the strictest sense primeval.

But the earliest records of Aryan worship and of Aryan speech, are not the only evidences we have of the comparative sublimity of the earliest known conceptions of the Divine Nature. The Egyptian records are older still; and some of the oldest are also the most sublime. A hymn to the rising and setting sun, which is contained in the 125th chapter of the "Book of the Dead,"

* Max Müller, "Hibbert Lectures," 1878, p. 193.

is said by Egyptian scholars to be "the most ancient piece of poetry in the literature of the world." * In this hymn the Divine Deity is described as the Maker of Heaven and of Earth, as the Self-existent One; and the elementary Forces of Nature, under the curious and profound expression of the "Children of Inertness," are described as His instruments in the rule and government of Nature.† Nor is it less remarkable that these old Egyptians seem to have grasped the idea of Law and Order as a characteristic method of the Divine government. He who alone is truly the Living One, is adored as living in the Truth, and in Justice considered as the unchanging and unchangeable Rule of Right in the Moral World, and of Order in Physical Causation.‡ The same grand conception has been traced in the Theology of the Vedas. The result of all this historical evidence may be given in the words of M. Renouf: "It is incontestably true that the sublimer portions of the Egyptian Religion are not the comparatively late result of a process of development or elimination from the grosser. The sublimer portions are demonstrably ancient; and the last stage of the Egyptian Religion, that known to the Greek and Latin writers, was by far the grossest and most corrupt."

* Renouf, "Hibbert Lectures," 1879, p. 197.

† *Ibid.*, pp. 198, 199. ‡ *Ibid.*, pp. 119, 120.

CHAPTER XIII.

Recapitulations and Conclusions.

IN a previous chapter I have observed how little we think of the assumptions which are involved in putting such questions as that respecting the origin of Religion. And here we have come to a point in our investigations at which it is very needful to remember again what some of these assumptions are. In order to do so let us look back for a moment and see where we stand.

We have found the clearest evidence that there is a special tendency in religious conceptions to run into developments of corruption and decay. We have seen the best reason to believe that the Religion of Savages, like their other peculiarities, is the result of this kind of evolution. We have found in the most ancient records of the Aryan language proof that the indications of religious thought are higher, simpler, and purer as we go back in time, until at last, in the very oldest compositions of human speech which have come down to us, we find the Divine Being spoken of in the sublime language which forms the opening of the Lord's Prayer. The date in absolute chronology of the oldest Vedic literature does not seem to be known. There is a

wide discrepancy between high authorities. Professor Max Müller considers that it may possibly take us back 5000 years.* This is probably an extreme estimate, and Professor Monier Williams seems to refer the most ancient Vedic Hymns to a period not much more remote than 1500 B.C.† But whatever that date may be, or the corresponding date of any other very ancient literature, such as the Chinese, or that of the oldest Egyptian papyri, when we go beyond these dates we enter upon a period when we are absolutely without any historical evidence whatever, not only as to the history of Religion, but as to the history and condition of Mankind. We do not know even approximately the time during which he has existed. We do not know the place or the surroundings of his birth. We do not know the steps by which his knowledge "grew from more to more." All we can see with certainty is that the earliest inventions of Mankind are the most wonderful that the race has ever made. The first beginnings of human Speech must have had their origin in powers of the highest order. On this subject there is a dangerous ambiguity in the theories of Scientific Etymology. Very often they seem to imply that Speech is the cause instead of being the consequence of Intellectual Conceptions.

* "Hibbert Lectures," p. 216.
† "Hinduism," p. 19.

From the first it has been Mind that has informed the Voice, and not Voice that has informed the Mind. Associated ideas have preceded associated sounds. It is not Language that has made Thought possible. It is Thought that has built up Language as an embodiment of itself. The function of Speech is not to originate Conceptions, but to express them, and to make them easy of communication and exchange. And so all the other acquirements of primeval times have been as it were the spontaneous growths and fruits of Mind. The first use of fire and the discovery of the methods by which it can be kindled; the domestication of wild animals; and above all the processes by which the various Cereals were first developed out of some wild Grasses—these are all discoveries with which in ingenuity and in importance no subsequent discoveries may compare. They are all unknown to History—all lost in the light of an effulgent Dawn. In speculating, therefore, on the origin of these things, we must make one or other of two assumptions—either that Man always had the same mental faculties and the same fundamental intellectual constitution that he has now, or that there was a time when these faculties had not yet risen to the level of Humanity, and when his mental constitution was essentially inferior.

On the first of these assumptions we proceed on

the safe ground of inquiry from the known to the unknown. We handle a familiar thing; we dissect a known structure; we think of a known agency. We speculate only on the manner of its first behaviour. Even in this process we must take a good deal for granted—we must imagine a good deal that is not easily conceivable. If we try to present to our own minds any distinct image of the first Man, whether we suppose him to have been specially created or gradually developed, we shall soon find that we are talking about a Being and about a condition of things of which Science tells us nothing, and of which the Imagination even cannot form any definite conception. The temptation to think of that Being as a mere Savage is very great, and this theory underlies nine-tenths of all speculations on the subject. But, to say the very least, this may not be true, and valid reasons have been adduced to show that it is in the highest degree improbable. That the first Man should have been born with all the developments of Savagery, is as impossible as that he should have been born with all the developments of Civilisation. The next most natural resource we have is to think of the first Man as something like a Child. But no man has ever seen a Child which never had a Parent as human as itself, or some one to represent such a Parent. We can form no picture in our mind's eye of the mental condition of the first

Man, if we suppose him to have had no communication with, and no instruction from, some Intelligence other than his own. A Child that has never been taught anything, and has never seen example, is a creature of which we have no knowledge, and of which therefore we can form no definite conception.

Our power of conceiving things is, of course, no measure of their possibility. But it may be well to observe where the impossibilities of conception are, or may be, of our own making. It is at least possible that the first Man may not have been born or created in the condition which we find to be so inconceivable. He may have been a Child, but having, what all other children have, some intimations of Authority and some acquaintance with its Source. At all events, let it be clearly seen that the denial of this possibility is an assumption; and an assumption too which establishes an absolute and radical distinction between Childhood as we know it, and the inconceivable conditions of a Childhood which was either without Parents, or with Parents who were comparatively Beasts. Professor Max Müller has fancied our earliest forefathers as creatures who at first had to be "roused and awakened from mere staring and stolid wonderment," by certain objects "which set them for the first time musing, pondering, and thinking on the visions floating before their eyes."

This is a picture evidently framed on the assumption of a Fatherless Childhood—of a Being born into the world with all the innate powers of Man, but absolutely deprived of all direct communication with any Mind or Will analogous to his own. No such assumption is admissible as representing any reasonable probability. But at least such imaginings as these about our First Parents have reference to their external conditions only, and do not raise the additional difficulties which are involved in the supposition that the first Man was half a Beast.

Very different is the case upon this other of the two assumptions which have been indicated above. On the assumption that there was a time when Man was different in his own proper nature from that nature as we know it now—when he was merely an animal not yet developed into a Man—on this assumption another element of the unknown is introduced, which is an element of absolute confusion. It is impossible to found any reasoning upon data which are not only unknown, but are in themselves unintelligible and inconceivable. Now it seems as if many of those who speculate on the origin of Religion have not clearly made up their minds whether they are proceeding on the first of these assumptions or on the second; that is to say, on the assumption that Man has always been, in respect to Faculty, what he now is, or on the assumption that he was once a

Beast. Perhaps, indeed, it would be strictly true to say that many of those who speculate on the origin of Religion proceed upon the last of these assumptions without avowing it, or even without distinctly recognising it themselves. It may be well, therefore, to point out here that on this assumption the question cannot be discussed at all. We must begin with Man as Man, when his development or his creation had made him what he is; not indeed as regards the acquisitions of experience or the treasures of knowledge, but what he is in Faculty and in Power, in the structure and habit of his Mind, in the instincts of his intellectual and moral nature.

But, as we have also seen in a former chapter,* there are two other assumptions between which we must choose. Besides assuming something as to the condition and the powers of the first Man, we must also make one or other of two assumptions as to the existence or non-existence of a Being to whom his Mind stands in close relation. One is the assumption that there is no God; and then the problem is, how Man came to invent one. The other is that there is a God; and then the question is, whether He first formed, and how long He left His Creature without any intuition or revelation of Himself.

It is really curious to observe in many speculations on the origin of Religion how unconscious the

* Chap. XI., *ante*.

writers are that they are making any assumption at all on this subject. And yet in many cases the assumption distinctly is that, as an objective Reality, God does not exist, and that the conception of such a Being is built up gradually out of wonderings and guessings about "the Infinite" and "the Invisible."

On this assumption I confess that it does not appear to me to be possible to give any satisfactory explanation of the origin of Religion. As a matter of fact, we see that the tendency to believe in divine or superhuman Beings is a universal tendency in the human Mind. As a matter of fact, also, we see that the conceptions which gather round this Belief —the ideas which grow up and are developed from one consequence to another respecting the character of these superhuman Personalities and their relations to Mankind—are beyond all comparison the most powerful agencies in moulding human nature for evil or for good. There is no question whatever about the fact that the most terrible and destructive Customs of barbarian and of savage life are customs more or less directly connected with the growth of religious superstitions. It was the perception of this fact which inspired the intense hatred of Religion, as it was known to him, which breathes in the memorable poem of Lucretius. In all literature there is no single line more true than the famous line—"Tantum religio potuit suadere malorum."

Nor is it less certain, on the other hand, that the highest type of human virtue is that which has been exhibited in some of those whose whole inspiration and rule of life has been founded on religious faith. Religious conceptions have been historically the centre of all Authority, and have given their strength to all ideas of Moral Obligation. Accordingly, we see that the same hatred which inspired Lucretius against Religion because of its power for evil, now inspires other men against it because of its power for good. Those who wish to sever all the bonds which bind human society together, the State, the Church, the Family, and whose spirits are in fierce rebellion against all Law, human or divine, are, and must be, bitter enemies of Religion. The idea must be unendurable to them of a Ruler who cannot be defied, of a Throne which cannot be overturned, of a Kingdom which endureth throughout all generations. The Belief in any Divine Personality as the source of the inexorable laws of Nature is a Belief which enforces, as nothing else can enforce, the idea of Obligation and the duty of Obedience.

It is not possible, in the light of the Unity of Nature, to reconcile this close and obvious relation between religious conceptions and the highest conditions of human life with the supposition that these conceptions are nothing but a dream. The power exercised over the mind and conduct of Mankind,

by the Belief in some Divine Personality with whom they have to do, is a power having all the marks that indicate an integral part of the System under which we live. But if we are to assume that this Belief does not represent a fact, and that its origin has been any other than a simple and natural perception of that fact, then this negation must be the groundwork of all our speculations on the subject, and must be involved, more or less directly, in every argument we use. But even on this assumption it is not a reasonable explanation of the fundamental postulates of all Religion—namely, the existence of superhuman Beings—to suppose that the idea of Personality has been evolved out of that which is Impersonal; the idea of Will out of that which has no Intelligence; the idea of Life out of that which does not contain it.

On the other hand, if we make the only alternative assumption—namely, that there is a God, that is to say, a Supreme Being, who is the Author of Creation—then the origin of Man's perception of this fact ceases to have any mystery other than that which attaches to the origin of all the other elementary perceptions of his Mind and Spirit. Not a few of these perceptions tell him of realities which are as invisible as the Godhead. Of his own passions, and of the passions of other men, his perception is immediate—of his own love, of his own anger, of his own pos-

session of just authority. The sense of owing obedience may well be as immediate as the sense of a right to claim it. Moreover, seeing the transcendent power of this perception upon his conduct, and, through his conduct, upon his fate, it becomes antecedently probable, in accordance with the analogies of Nature and of all other created Beings, that from the very first, and as part of the outfit of his nature, some knowledge was imparted to him of the existence of his Creator, and of the duty which he owed to Him.

Of the methods by which this knowledge was imparted to him, we are as ignorant as of the methods by which other innate perceptions were implanted in him. But no special difficulty is involved in the origin of a perception which stands in such close relation to the Unity of Nature. It has been demanded indeed, as a postulate in this discussion, that we should discard all notions of antecedent probability—that we should take nothing for granted, except that Man started on his course furnished with what are called his Senses, and with nothing more. And this demand may be acceded to, provided it be well understood what our Senses are. If by this word we are to understand nothing more than the gates and avenues of approach through which we derive an impression of external objects—our sight, and touch, and smell, and taste, and hearing—then,

indeed, it is the most violent of all assumptions that they are the only faculties by which knowledge is acquired. There is no need to put any disparagement on these Senses, or to undervalue the work they do. Quite the contrary. It has been shown in a former chapter how securely we may rest on the wonder and on the truthfulness of these Faculties as a pledge and guarantee of the truthfulness of other Faculties which are conversant with higher things. When we think of the Mechanism of the Eye, and of the inconceivable minuteness of the ethereal movements which that Organ enables us to separate and to discriminate at a glance, we get hold of an idea having an intense interest and a supreme importance. If Adjustments so fine and so true as these have been elaborated out of the Unities of Nature, whether suddenly by what we imagine as Creation, or slowly by what we call Development, then may we have the firmest confidence that the same Law of Natural Adjustment has prevailed in all the other Faculties of the perceiving and conceiving Mind. The whole structure of that Mind is, as it were, revealed to be a Structure which is in the nature of a Growth—a Structure whose very property and function it is to take in and assimilate the truths of Nature—and that in an ascending order, according to the rank of those truths in the System and Constitution of the Universe. In this connection

of thought too great stress cannot be laid on the wonderful language of the Senses. In the light of it the whole Mind and Spirit of Man becomes one great mysterious Retina for reflecting the images of Eternal Truth. Our moral and intellectual perceptions of things which in their very nature are invisible, come home to us as invested with a new authority. It is the authority of an Adjusted Structure—of a mental organisation which has been moulded by what we call natural causes—these being the causes on which the Unity of the World depends.

And when we come to consider how this moulding, and the moulding of the human Body, deviates from that of the lower animals, we discover in the nature of this deviation a Law which cannot be mistaken. That Law points to the higher power and to the higher value in his economy of Faculties which lie behind the Senses. The human frame diverges from the frame of the Brutes, so far as the mere bodily senses are concerned, in the direction of greater helplessness and weakness. Man's sight is less piercing than the Eagle's. His hearing is less acute than the Owl's or the Bat's. His sense of smell may be said hardly to exist at all when it is compared with the exquisite susceptibilities of the Dog and of the Deer, of the Weasel, or of the Fox. The whole principle and plan of structure in the Beasts which are supposed to be nearest to him in

form, is a principle and a plan which is almost the converse of that on which his structure has been organised. The so-called man-like Apes are highly specialised; Man on the contrary is as highly generalised. They are framed to live almost entirely on trees, and to be dependent on arboreal products, which only a very limited area in the Globe can supply. Man is framed to be independent of all local conditions, except indeed those extreme conditions which are incompatible with the maintenance of Organic Life in any form. If it be true, therefore, that he is descended from some "arboreal animal with pointed ears," he has been modified during the steps of that descent on the principle of depending less and less on Senses such as the lower animals possess, and more and more on what may be called the Senses of his Mind. The unclothed and unprotected condition of the human body, the total absence of any organic weapon of defence, the want of teeth adapted even for prehension, and the same want of power for similar purposes in the hands and fingers—these are all changes and departures from the mere animal type which stand in obvious relation to the mental powers of Man. Apart from these, they are changes which would have placed the new Creature at a hopeless disadvantage in the struggle for existence. It is not easy to imagine,—indeed we may safely say that it

is impossible to conceive—the condition of things during any intermediate steps in such a process. It seems as if there could be no safety until it had been completed—until the enfeebled Physical Organisation had been supported and reinforced by the new capacities for Knowledge and Design.

This, however, is not the point on which we are dwelling now. We are not now speculating on the origin of Man. We are considering him only as he is, and as he must have been since he was Man at all. And in that structure as it is, we see that the bodily Senses have a smaller relative importance than in the Beasts. To the Beasts these Senses tell them all they know. To us they speak but little compared with all that our Spirit of Interpretation gathers from them. But that Spirit of Interpretation is in the nature of a Sense. In the lower animals every external stimulus moves to some appropriate action. In Man it moves to some appropriate thought. This is an enormous difference; but the principle is the same. We can see that, so far as the mechanism is visible, the plan or the principle of that mechanism is alike. The more clearly we understand that this organic mechanism has been a Growth and a Development, the more certain we may be that in its structure it is self-adapted, and that in its working it is true. And the same principle

applies to those other Faculties of our mental constitution which have no outward Organ to indicate the machinery through which their operations are conducted. In them the Spirit of Interpretation is in communication with the realities which lie behind phenomena—with energies which are kindred with its own.

And so we come to understand that the processes of Development or of Creation, whatever they may have been, which culminated in the production of a Being such as Man, are processes wholly governed and directed by a Law of Adjustment between the higher Truths which it concerns him most to know, and the evolution of Faculties by which alone he could be enabled to apprehend them. There is no difficulty in conceiving these processes carried to the most perfect consummation, as we do see them actually carried to very high degrees of excellence in the case of a few men of extraordinary genius, or of extraordinary virtue. In science the most profound conclusions have been sometimes reached without any process of conscious reasoning. It is clearly the law of our nature, however, that the triumphs of Intellect are to be gained only by laborious thought, and by the gains of one generation being made the starting-point for the acquisition of the next. This is the general law. But it is a law which itself assumes certain primary Intuitions of

the Mind as the starting-point of all. If these were wrong, nothing could be right. The whole processes of reasoning would be vitiated from the first. The first Man must have had these as perfectly as we now have them, else the earliest steps of Reason could never have been taken, and the earliest rewards of discovery could never have been secured.

But there is this great difference between the moral and intellectual nature of Man, that whereas in the work of Reasoning the perceptions which are primary and intuitive require to be worked out and elaborately applied, in Morals the perceptions which are primary are all in all. It is true that here also the applications may be infinite, and the doctrines of Utility have their legitimate application in enforcing, by the Sense of Obligation, whatever course of conduct Reason may determine to be the most fitting and the best. The Sense of Obligation in itself is, like the sense of logical sequence, elementary, and, like it, is part and parcel of our mental constitution. But unlike the mere sense of logical sequence, the sense of moral Obligation has one necessary and primary application which from the earliest moment of Man's existence may well have been all-sufficient. Obedience to the will of legitimate Authority is, as we have seen in a former chapter, the first duty and the first idea of duty in the mind of every Child. If ever there was a Man who had no earthly Father, or

if ever there was a Man whose Father was, as compared with himself, a Beast, it would seem a natural and almost a necessary supposition that, along with his own new and wonderful power of self-consciousness, there should have been associated a consciousness also of the Presence and the Power of that Creative Energy to which his own Development was due. It is not possible for us to conceive what form the consciousness would take. "No man hath seen God at any time." This absolute declaration of one of the Apostles of the Christian Church proves that they accepted as metaphorical the literal terms in which the first communications between Man and his Creator are narrated in the Jewish Scriptures. It is not necessary to suppose that the Almighty was seen by His first human Creature walking in bodily form in a garden "in the cool of the day." The strong impressions of a spiritual Presence and of spiritual communications which have been the turning-point in the lives of men living in the bustle of a busy and corrupted world, may well have been even more vivid and more immediate when the first "Being worthy to be called a man" stood on this Earth alone. The light which shone on Paul of Tarsus on the way to Damascus may have been such a light as shone on the Father of our race. Or the communication may have been what metaphysicians call purely subjective, such as

in all ages of the world do sometimes "flash upon that inward eye which is the bliss of solitude." But none the less may they have been direct and overpowering. The earliest and simplest conception of the Divine Nature might well also be the best. And although we are forbidden to suppose the embodiment and visibility of the Godhead, we are not driven to the alternative of concluding that there never could have been anything which is to us unusual in the intimations of His presence.

Yet this is another of the unobserved assumptions which are perpetually made—the assumption of an Uniformity in Nature which does not exist. That "all things have continued as they are since the Beginning" is conceivable. But that all things should have continued as they were since before the Beginning is a contradiction in terms. In primeval times many things had then just been done of which we have no knowledge now. When the Form of Man had been fashioned and completed for the first time, like and yet unlike to the bodies of the Beasts; when all their Organs had been lifted to a higher significance in his; when his hands had been liberated from walking and from climbing, and had been elaborated into an instrument of the most subtle and various use; when his feet had been adapted for holding him in the erect position; when his breathing apparatus had been set to musical

chords of widest compass and the most exquisite tones; when all his Senses had become ministers to a Mind endowed with Wonder and with Reverence, and with Reason and with Love—then a work had been accomplished such as the world had not known before, and such as has never been repeated since.

All the conditions under which that work was carried forward must have been happy conditions—conditions, that is to say, in perfect harmony with its progress and its end. They must have been favourable, first, to the production, and then to the use, of those higher Faculties which separated the new Creature from the Beasts. They must have been in a corresponding degree adverse to and incompatible with the prevalence of conditions tending to reversion or to degradation in any form. That long and gradual ascent, if we assume it to have been so,—or, as it may have been, that sudden Transfiguration,—must have taken place in a congenial air and amid surroundings which lent themselves to so great a change. On every conceivable theory, therefore, of the origin of Man, all this seems a necessity of thought. But perhaps it seems on the Theory of Development even more a necessity than on any other. It is of the essence of that Theory that all things should have worked together for the good of the Being that was to be. On the lowest interpretation, this "toil co-operant to an end" is always the

necessary result of forces ever weaving and ever interwoven. On the higher interpretation it is the same. Only, some Worker is ever behind the work. But under either interpretation the conclusion is the same. That the first Man should have been a Savage, with instincts and dispositions perverted as they are never perverted among the Beasts, is a supposition impossible and inconceivable. Like every other creature, he must have been in harmony with his origin and his end—with the path which had led him to where he stood, with the work which made him what he was. It may well have been part of that work—nay, it seems almost a necessary part of it—to give to this new and wonderful Being some knowledge of his Whence and Whither — some open vision, some Sense and Faculty Divine.

With arguments so deeply founded on the Analogies of Nature in favour of the conclusion that the first Man, though a Child in acquired knowledge, must from the first have had instincts and intuitions in harmony with his origin and with his destiny, we must demand the clearest proof from those who assume that he could have had no conception of a Divine Being, and that this was an idea which could only be acquired in time from staring at things too big for him to measure, and from wondering at things too distant for him to reach. Not even his

powers could extract from such things that which they do not contain. But in his own Personality, fresh from the hand of Nature,—in his own Spirit just issuing from the fountains of its birth,—in his own Will, willing according to the Law of its Creation,—in his own Desire of Knowledge,—in his own Sense of Obligation,—in his own Wonder and Reverence and Awe,—he had all the elements to enable him at once to apprehend, though not to comprehend, the Infinite Being who was the Author of his own.

It is, then, with that intense interest which must ever belong to new evidence in support of fundamental Truths that we find these conclusions, founded as they are on the analogies of Nature, confirmed and not disparaged by such facts as can be gathered from other sources of information. Scholars who have begun their search into the origin of Religion in the full acceptance of what may be called the savage theory of the origin of Man,—who, captivated by a plausible generalisation, had taken it for granted that the farther we go back in time the more certainly do we find all Religion assuming one or other of the gross and idolatrous forms which have been indiscriminately grouped under the designation of Fetishism—have been driven from this Belief by discovering to their surprise that facts do not support the theory. They have found, on the contrary, that up to the farthest limits which are

reached by records which are properly historical, and far beyond those limits to the remotest distance which is attained by evidence founded on the analysis of human Speech, the religious conceptions of men are seen, as we go back in time, to have been not coarser and coarser, but simpler, purer, higher —so that the very oldest conceptions of the Divine Being of which we have any certain evidence are the simplest and the best of all.

In particular, and as a fact of typical significance, we find very clear indications that everywhere Idolatry and Fetishism appear to have been corruptions, whilst the higher and more spiritual conceptions of Religion which lie behind, do generally even now survive among idolatrous tribes as vague surmises or as matters of speculative belief. Nowhere even now, it is confessed, is mere Fetishism the whole of the Religion of any people. Everywhere, in so far as the history of it is known, it has been the work of Evolution, — the development of tendencies which are deviations from older paths. And not less significant is the fact that everywhere in the imagination and traditions of Mankind there is preserved the memory and the belief in a Past better than the Present. "It is a constant saying," we are told, "among African tribes that formerly Heaven was nearer to Man than it is now; that the highest God, the Creator Himself, gave formerly

lessons of wisdom to human Beings; but that afterwards He withdrew from them, and dwells now far from them in Heaven." All the Indian races have the same tradition; and it is not easy to conceive how a Belief so universal could have arisen unless as a survival. It has all the marks of being a Memory and not an Imagination. It would reconcile the origin of Man with that Law which has been elsewhere universal in Creation—the Law under which every Creature has been produced not only with appropriate powers, but with appropriate Instincts and Intuitive Perceptions for the guidance of these powers in their exercise and use. Many will remember the splendid lines in which Dante has defined this Law, and has declared the impossibility of Man having been exempt therefrom :—

> Nell' ordine ch'io dico sono accline
> Tutte nature per diverse sorti
> Più al principio loro, e men vicine;
> Onde si muovono a diversi porti
> Per lo gran mar dell' essere; e ciascuna
> Con istinto a lei dato che la porti.
>
> * * * * *
>
> Nè pur le creature, che son fuore
> D'intelligenzia, quest'arco saetta,
> Ma quelle c'hanno intelletto ed amore.*

The only mystery which would remain is the mystery which arises out of the fact that somehow those Instincts have in Man not only been liable to fail,

* "Paradiso," canto i. 110–120.

but that they seem to have acquired apparently an ineradicable tendency to become perverted. But this is a lesser mystery than the mystery which would attach to the original birth or creation of any Creature in the condition of a human Savage. It is a lesser mystery because it is of the essence of a Being whose Will is comparatively free that he should be able to deviate from his appointed path. The Origin of Evil may appear to us to be a great mystery. But this at least may be said in mitigation of the difficulty, that without the possibility of Evil there could be no possibility of any Virtue. Among the lower animals Obedience has always been a necessity. In Man it was raised to the dignity of a duty. It is in this great change that we can see and understand how it is that the very elevation of his nature is inseparable from the possibility of a Fall. The mystery, then, which attaches to his condition now is shifted from his endowments and his gifts to the use he made of them. The question of the origin of Religion is merged and lost in the question of the origin of Man. And that other question, how his Morals and how his Religion came to be corrupted, becomes intelligible on the supposition of wilful disobedience with all its tendencies and consequences having become "inherited and organised in the race."

It is indeed most curious and instructive to observe that this formula of expression which has arisen in a

School of Philosophy specially opposed to all theological conceptions, is one which seems as if it had been invented to give scientific form to that doctrine of the Christian Church which perhaps of all others it is most difficult to accept or understand. If it is the tendency of all action, whether for good or evil, to perpetuate itself, and to descend from one generation to another by hereditary transmission, then we have a strictly scientific explanation of the fact of inherited corruption in human nature, or as it is called in the language of Theology, of Original Sin. It may be that this doctrine has been taught with accretions which do not belong to it, and in forms which have rather concealed than revealed its truth. The very words "Original Sin" do not seem accurately to express a condition of things which is always expressly represented as not original, but secondary and superinduced. But it is of the highest interest to observe that men looking into Nature with other views, and very different preconceptions, have seen a Law which really does, in some measure at least, explain the terrible reality of inherited corruption.

Nor is it less remarkable that whilst this Law of action "inherited and organised in the race" does really cover and express the facts of our human nature as well as the Christian doctrine on the subject, it is of no force or value whatever in the particular argument in which it is commonly employed.

The Law or the theory of action "inherited and organised" in races was conceived and laid down as a means of getting rid of and superseding the idea of original Instincts and Intuitions. But this it can never do, because, as we have seen, all animal Instincts are inseparably connected with Structure, and are invariably the expression and the index of some Organic Apparatus. Consequently, as every Organic Apparatus is a growth, and is essentially innate, the corresponding impulses of Mind can only have the same origin, and must be innate precisely in the same sense, and in the same degree. The truth is that the law of Hereditary Transmission, like the law of Natural Selection, can account for the origin of nothing. Neither of these laws can have any operation except upon things which have already begun to be. Whilst therefore the law of Hereditary Transmission—or as it is now called, the law of Heredity—can never account for the origin of Organic Instincts, it can, and it does in some degree, account for the perversion of these Instincts. It is not the use, but the abuse of Instincts which needs an explanation. When we seek to know the origin of anything, we assume and start from some anterior condition of things. But simple non-existence is the only condition of things which we can conceive as anterior to the first origin of every Organic Being. Its Organs cannot have been shaped by use; because

they must have been formed before they could be used. But when we come to seek an explanation of the origin of perverted Instincts, and of corrupted nature, we have an anterior condition of things which we not only may, but which we must, assume as a necessity of thought. That anterior condition is one in which every action of every living thing began and grew in perfect unison with its corresponding Organic Structure—not preceding that Structure or causing it, but accompanying its growth, and resulting from it. Whilst therefore the law of Heredity can never account for the origin of Instincts or Intuitions which are in harmony with the Order and the Reasonableness of Nature, it may well be accepted in a case where we have to account for tendencies and propensities which have no such character—which are exceptions to the Unity of Nature, and at variance with all that is intelligible in its Order, or reasonable in its Law.

If all explanation essentially consists in the reduction of phenomena into the terms of human thought and into the analogies of human experience, this is the explanation which can alone reconcile the unquestionable Corruption of Human Character with the Analogies of Creation.

I must now bring these chapters to a close. If the conclusions to which they point are true, then

we have in them some foundation-stones strong enough to bear the weight of an immense, and, indeed, of an immeasurable superstructure. If the Unity of Nature is not a unity which consists in mere sameness of material, or in mere identity of composition, or in mere uniformity of structure, but a unity which the Mind recognises as the result of operations similar to its own; if Man, not in his Body only, but in the highest as well as in the lowest attributes of his Spirit, is inside this Unity and part of it; if all his mental powers are, like the Instincts of the Beasts, founded on an Organic Harmony between his Faculties and the realities of Creation; if the limits of his knowledge do not affect its certainty; if its accepted truthfulness in the lower fields of thought arises out of correspondences and adjustments which are applicable to all the energies of his Intellect, and all the aspirations of his Spirit; if the moral character of Man, as it exists now, is the one great anomaly in Nature—the one great exception to its Order and to the perfect harmony of its laws; if the corruption of this moral character stands in immediate and necessary connection with, and indeed essentially consists in, rebellion against the Authority on which that Order rests; if all ignorance and error and misconception respecting the nature of that Authority and of its commands

has been and must be the cause of increasing deviation, disturbance, and perversion; if it is a great natural law that every tendency of thought, and every habit of Mind, whether in a right or in a wrong direction, is prone to become inherited and organised in the race,—then, indeed, we have a view of things which is full of light. Dark as the difficulties which remain may be, they are not of a kind to undermine all certitude, or to discomfit all conviction. On the contrary, it is impressed upon us that the System under which we live, is not only a System accessible to our Intelligence, but so united to it that all the mysteries of the Universe, visible and invisible, are epitomised and enfolded in ourselves. And so we come to feel that our knowledge and our understanding of that System must "grow from more to more" in proportion as the whole of our own nature is laid open to the whole of its intimations, and the highest of our Faculties are kept in conscious and wakeful recognition of the Work and of the Power to which they stand related. Then also it will come to be plain to us that we may expect in that System, and that we may trust to it for, teaching of the highest kind, insomuch that Inspiration and Revelation are to be regarded not as incredible, or even as rare phenomena, but as operations which in various measures and degrees are altogether according to the natural constitution and course of things. For of this kind

essentially are all the wonderful Instincts of the lower animals and all the primary Intuitions of the human Mind. Of this kind especially are all those Gifts and Powers by which alone we can gain the very earliest lessons of Experience or mount the very first steps of Reason. And as these primary Intuitions of the Mind give us our first entrance into some of the realities which lie behind phenomena, so, among these realities there is a still higher region into which our entrance may well be gained only by processes which are analogous. For, just as there are Truths related to the Reason which only the Intellect can appreciate, so there are others related to the Spirit which, in strict analogy, can only be spiritually discerned. And as, on the principle of the Unity of Nature, our Spiritual sense must be the Organic expression and result of a relation with real things, it is to be confidently expected that it can and will be fed with its appropriate food—that it can and will be strengthened and enlightened by communications from a kindred Source.

Let destructive criticism, then, do its work. But let that work be itself subjected to the same rigid analysis which it professes to employ. Under this analysis, unless I am much mistaken, the processes of the Negative Philosophy will be found defective. They systematically suppress more than one-half of the Facts of Nature; and as systematically they silence

more than one half of the Faculties of Man. Moreover, the Faculties which they especially try to silence are the very highest Faculties of discernment which Nature gives to us. In the physical sciences we know what results would follow from such methods of treatment. Our work in the human Laboratory is poor and weak enough, and of a thousand substances, having marvellous properties, we can give, after all is done, only a poor and beggarly account. But at least in these fields of research we do our very best. Nothing is thrown aside. Nothing is unobserved. Nothing is unrecorded. Every particle is kept that it may tell its story. Nor is our care confined to the Atoms or to the Molecules which can be weighed or measured. For when the Visible is transcended, we strain all the powers of Language to express the purely intellectual conceptions of Force and Energy, of Affinity and of Attraction, which are needed to help our understanding of the facts and of their dynamical interpretations. With all these helps, that understanding remains imperfect. Yet in the far more difficult work of interpreting the vast System of Nature, with all its immeasurable wealth of Mind, the Agnostic philosophy deliberately sets aside everything that is kindred with the highest parts of our own moral and intellectual Structure. These are all absolutely excluded from the meanings and the sequences—from the

anticipations and the analogies of Creation. To those who have grasped the great Doctrine of the Unity of Nature, and have sounded the depth of its meaning and the sweep of its applications, this method of inquiry will appear self-condemned. That which pretends to be the universal solvent of all Knowledge and of all Belief, will be found to be destitute of any power to convict of falsehood the universal Instinct of Man, that by a careful and conscientious use of the appropriate means—by listening to the appropriate Voices—he can, and he does, attain—in the spiritual regions of the Invisible, as well as in the material regions of the Physical World—to a substantial knowledge of the Truth.

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